FIRE / SMOKE BARRIER DESIGN	IATIONS
SHALL VERIFY RATINGS WITH THE LATEST	VIENIENCE OF THE CONTRACTOR. THE CONTRACTOR T SET OF ARCHITECTURAL PLANS AND FURNISH ALL THOSE RATINGS WHETHER SHOWN OR NOT.
	NATED AS 2 HOUR FIRE, BARRIER(S), UNLESS NOTED RE ACQUIRED FROM THE ARCHITECTURAL PLANS.
1 HOUR FIRE BARRIER	

\_\_\_\_\_

2 HOUR FIRE BARRIER

SMOKE BARRIER

VA FORM 08-6231, OCT 1978

MECHANICAL DEMOLITION NOTES: THE DRAWINGS ARE INTENDED TO INDICATE THE SCOPE OF DEMOLITION WORK REQUIRED AND DO NOT INDICATE EVERY PIPE, DUCT, OR PIECE OF EQUIPMENT THAT MUST BE REMOVED. ACCESSIBILITY OF EQUIPMENT AND SYSTEMS IS NOT SHOWN NOR SHOULD IT BE INFERRED. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND VERIFY EXISTING CONDITIONS. CONTRACTOR IS RESPONSIBLE FOR ALL COST ASSOCIATED WITH CEILING SYSTEM DISASSEMBLY AND REASSEMBLY TO ACCOMMODATE THIS WORK. CONTRACTOR TO SALVAGE, STORE, AND REINSTALL ALL CEILING MOUNTED DEVICES. CONTRACTOR TO COORDINATE WITH OWNER FOR ALL MECHANICAL SERVICE OUTAGES. EXISTING WATER SYSTEM: MAINTAIN EXISTING SYSTEM IN SERVICE UNTIL NEW SYSTEM IS COMPLETE AND READY FOR SERVICE. DRAIN SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. OBTAIN PERMISSION FROM OWNER AT LEAST 72 HOURS BEFORE PARTIALLY OR COMPLETELY DRAINING SYSTEM. MINIMIZE OUTAGE DURING OPERATION. CONTRACTOR IS RESPONSIBLE FOR PATCHING ALL PENETRATIONS CREATED BY REMOVAL OF EQUIPMENT, DUCTWORK, PIPING, ETC. TO MATCH EXISTING. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK. PATCH TO MATCH ORIGINAL CONSTRUCTION. VERIFY ALTERNATIVE OR SPECIAL REPAIR METHODS WITH ARCHITECT/ENGINEER BEFORE PROCEEDING WITH DEMOLITION. CONTRACTOR IS RESPONSIBLE FOR ALL MODIFICATIONS TO THE EXISTING HVAC PIPING AND DUCTWORK NECESSARY TO PERMIT THE INSTALLATION OF NEW PROVIDE TEMPORARY CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. WHEN WORK MUST BE PERFORMED ON OPERATING EQUIPMENT, USE PERSONNEL EXPERIENCED IN SUCH EXTEND EXISTING INSTALLATIONS USING MATERIAL AND METHODS COMPATIBLE WITH EXISTING MECHANICAL INSTALLATIONS, OR AS SPECIFIED FOR INTENDED ALL SYSTEM CHANGEOVERS BE COMPLETED IN OVERTIME, NOT DURING NORMAL WORKING HOURS. . REMOVE, RELOCATE, AND EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTION. . REMOVE ABANDONED DUCTS AND PIPING TO SOURCE OF SUPPLY AND/OR MAIN LINES AND CAP OR MAKE READY FOR RECONNECTION IF SERVICE IS EXTENDED AS PART OF NEW WORK. . REMOVE EXPOSED ABANDONED PIPING AND DUCTS, INCLUDING ABANDONED PIPING AND DUCTS ABOVE ACCESSIBLE CEILING FINISHES. CUT DUCTS FLUSH WITH WALLS AND FLOORS, CAP DUCT THAT REMAINS, AND PATCH SURFACES. CUT PIPING ABOVE CEILINGS, BELOW FLOORS, AND BEHIND WALLS. CAP REMAINING LINES. REMOVE ALL ASSOCIATED CLAMPS, HANGERS, SUPPORTS, ETC., ASSOCIATED WITH PIPING AND DUCT . DISCONNECT AND REMOVE MECHANICAL DEVICES AND EQUIPMENT SERVING EQUIPMENT THAT HAS BEEN

. MAINTAIN ACCESS TO EXISTING MECHANICAL

REMAIN THE PROPERTY OF THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE

INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANEL AS

. MECHANICAL ITEMS REMOVED AND NOT RELOCATED

DISPOSAL OF MATERIAL THE OWNER DOES NOT WANT TO REUSE OR RETAIN FOR MAINTENANCE PURPOSES.

**GENERAL MECHANICAL NOTES:** DRAWINGS SHOWING LOCATIONS OF EQUIPMENT, DUCTWORK, PIPING, ETC. ARE DIAGRAMMATIC AND MAY NOT ALWAYS REFLECT ACTUAL INSTALLATION CONDITIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL DUCTWORK, PIPING, EQUIPMENT, ETC., AND MAY NOT INCLUDE ALL OFFSETS AND FITTINGS REQUIRED FOR COMPLETE INSTALLATION. THE DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION AND THE WORK OF OTHERS WILL PERMIT. DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS AND CLEARANCES FROM ARCHITECTURAL, STRUCTURAL, SUBMITTALS, AND OTHER APPROPRIATE DRAWINGS OR PHYSICALLY AT SITE. READ ALL SPECIFICATIONS. REVIEW ALL DRAWINGS, INCLUDING THOSE OF OTHER TRADES. LAYOUT AND COORDINATE ALL WORK WITH ALL OTHER TRADES PRIOR TO INSTALLATION TO PROVIDE CLEARANCES REQUIRED FOR OPERATION, MAINTENANCE, CODE COMPLIANCE, AND TO VERIFY NON-INTERFERENCE WITH OTHER WORK, DO NOT FABRICATE PRIOR TO VERIFICATION OF NECESSARY CLEARANCES FOR ALL TRADES. BRING ANY INTERFERENCES OR CONFLICTS TO THE ATTENTION OF THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH ANY FABRICATION OR EQUIPMENT ORDERS. CONTRACTOR IS RESPONSIBLE FOR REVIEW OF SPACE REQUIREMENTS OF EQUIPMENT SPECIFIED OR SUBSTITUTED AND MAKING REASONABLE ACCOMMODATIONS IN LAYOUT AND POSITIONING TO PROVIDE PROPER ACCESS. ANY CHANGES THAT ARE REQUIRED TO ELIMINATE CONFLICTS AND RESULT FROM A FAILURE TO COORDINATE SHALL BE MADE BY THE CONTRACTOR WITHOUT ADDITIONAL COST OR EXPENSE TO THE CAULK ALL PIPE AND DUCT PENETRATIONS OF FULL HEIGHT NON FIRE RATED WALLS, PARTITIONS, FLOORS AND ROOF ASSEMBLIES. THIS IS ESSENTIAL TO PREVENT NOISE TRANSMISSION FROM ONE ROOM TO ANOTHER AND TO PROVIDE THE DESIRED NC LEVELS WITHIN THE ROOMS. CONTRACTOR IS RESPONSIBLE FOR ALL COST ASSOCIATED WITH ELECTRICAL CHANGES REQUIRED FOR EQUIPMENT DIFFERENT THAN THE BASIS OF REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF ALL CEILING MOUNTED TERMINAL AIR BOX (TAB) NUMBER OR REHEAT COIL NUMBER IS SHOWN ADJACENT TO THERMOSTAT ONLY

WHEN THE TAB OR COIL WHICH THE THERMOSTAT IS

. ALIGN LIGHT SWITCHES AND TEMPERATURE SENSORS

WHEN IN CLOSE PROXIMITY TO EACH OTHER.

. PROVIDE ACCESS DOORS AT ALL DUCT MOUNTED

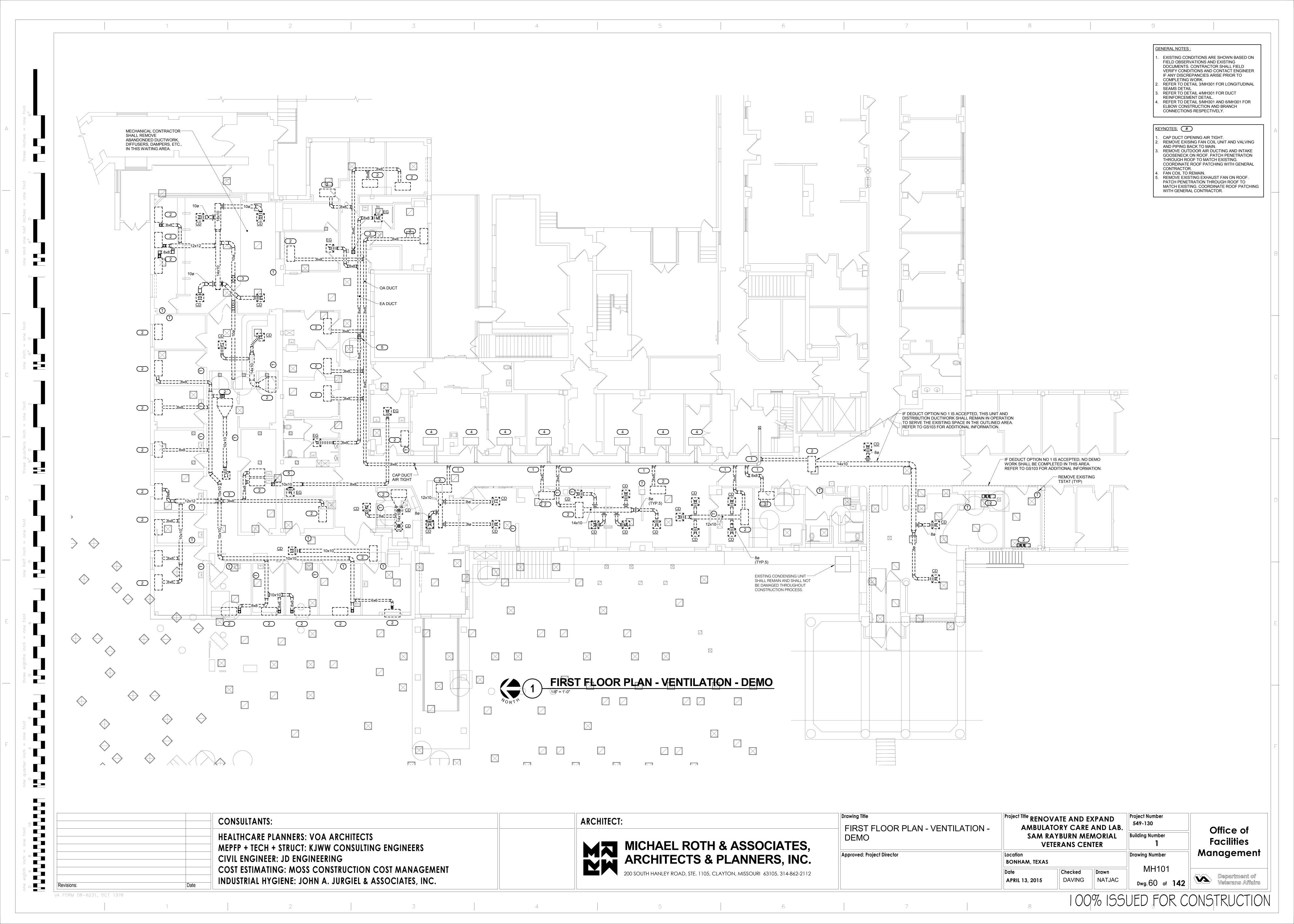
CONTROLLING IS AMBIGUOUS.

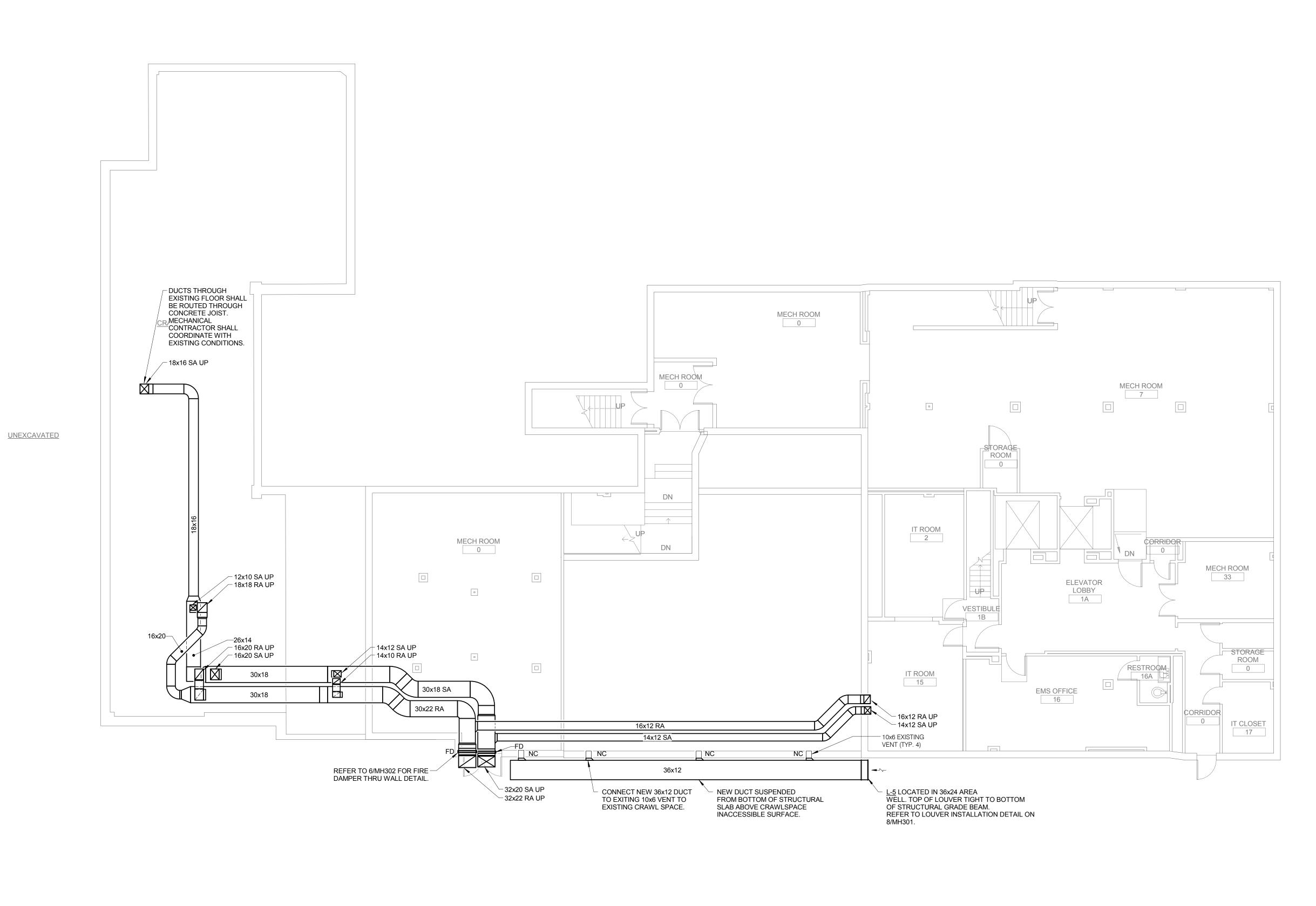
EQUIPMENT.

DESIGN CODES: YEAR: DESCRIPTION: INTERNATIONAL BUILDING CODE 2012 INTERNATIONAL MECHANICAL CODE 2012 INTERNATIONAL PLUMBING CODE 2012 INTERNATIONAL FIRE CODE 2012 CONTACT PERSONS PERSON: DESCRIPTION: PROJECT MANAGER DAVID LARSON NATE JACQUES MECHANICAL ENGINEER

**VENTILATION SYMBOLS LIST** EXISTING DUCT TO REMAIN EXISTING DUCT TO BE REMOVED NEW DUCT FLEXIBLE DUCT DIRECTION OF AIR FLOW MANUAL VOLUME DAMPER SUPPLY/OUTSIDE AIR DUCT SECTION RETURN AIR DUCT SECTION EXHAUST/RELIEF AIR DUCT SECTION AIR TERMINAL PROPERTIES SYMBOL NECK SIZE/CFM TERMINAL AIR BOX I ERMINAL AIR BUX
(REFER TO SCHEDULE) TERMINAL AIR BOX w/REHEAT COIL ### (REFER TO SCHEDULE) H V V V HUMIDIFIER OPPOSED BLADE DAMPER (REFER TO SCHEDULE) PARALLEL BLADE DAMPER (REFER TO SCHEDULE) (C) CARBON MONOXIDE SENSOR CARBON DIOXIDE SENSOR HUMIDISTAT SENSOR HUMIDISTAT/SENSOR (DUCT MOUNTED) PRESSURE SENSOR/MONITOR PRESSURE SENSOR (DUCT MOUNTED) THERMOSTAT/SENSOR TEMPERATURE SENSOR (DUCT MOUNTED) THERMOSTAT/SENSOR w/HEAVY DUTY ACCESS DOOR ABOVE FINISHED FLOOR AFF EXHAUST/RELIEF AIR ELECTRICAL CONTRACTOR FIRE DAMPER FIRE/SMOKE DAMPER FACILITY MANAGEMENT CONTROL SYSTEM GENERAL CONTRACTOR HEATING CONTRACTOR MIXED AIR MECHANICAL CONTRACTOR NEW CONNECTION OUTSIDE AIR RETURN AIR SUPPLY AIR SMOKE DAMPER V.C. VENTILATION CONTRACTOR T.C.C. TEMPERATURE CONTROLS CONTRACTOR

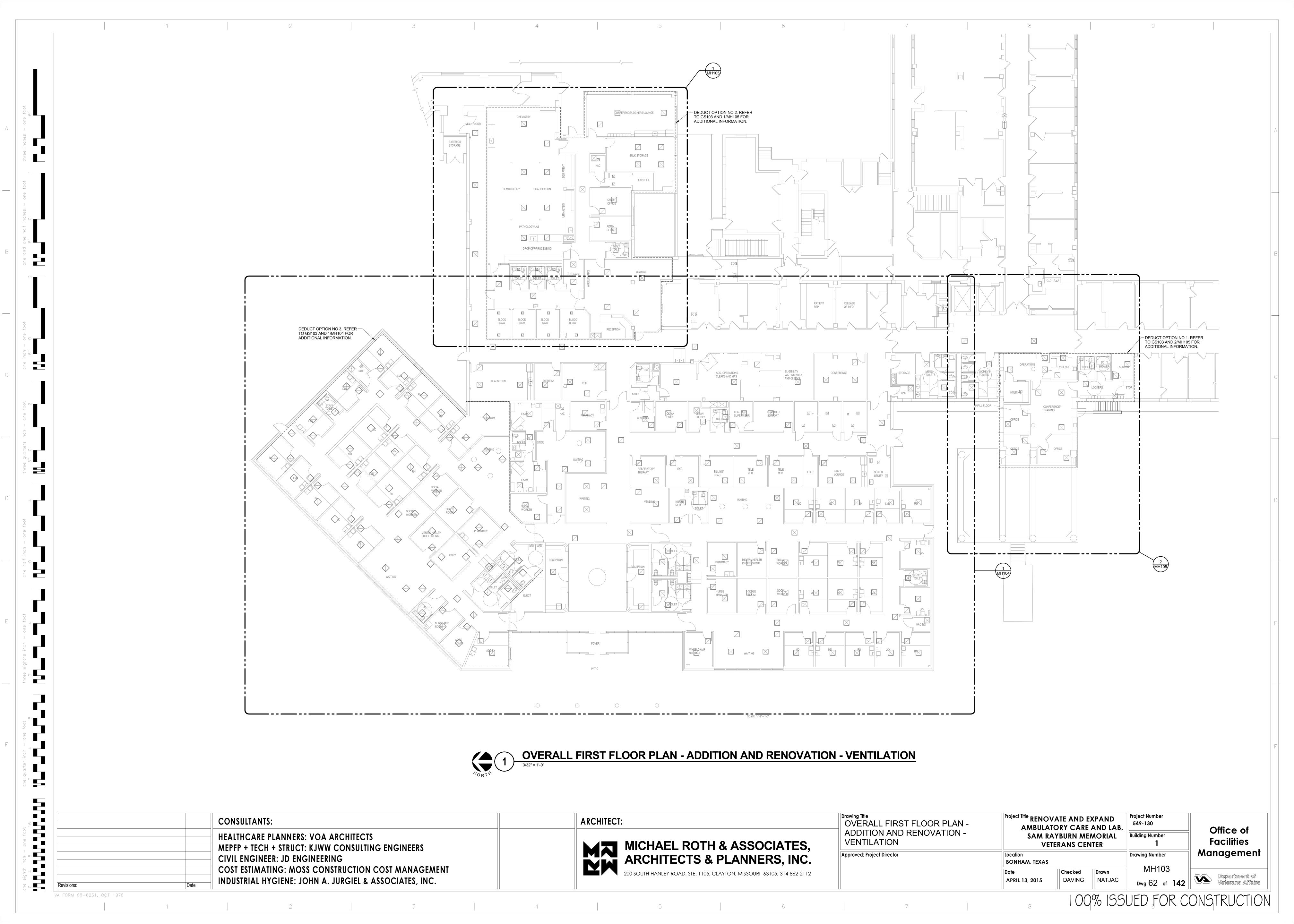
Drawing Title Project Title RENOVATE AND EXPAND **CONSULTANTS:** ARCHITECT: 549-130 AMBULATORY CARE AND LAB. Office of **VENTILATION COVER SHEET** HEALTHCARE PLANNERS: VOA ARCHITECTS SAM RAYBURN MEMORIAL **Building Number Facilities** MICHAEL ROTH & ASSOCIATES, ARCHITECTS & PLANNERS, INC. **VETERANS CENTER** MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS Management **Approved: Project Director Drawing Number** CIVIL ENGINEER: JD ENGINEERING BONHAM, TEXAS COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT Checked 200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112 INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC. **APRIL 13, 2015** DAVING

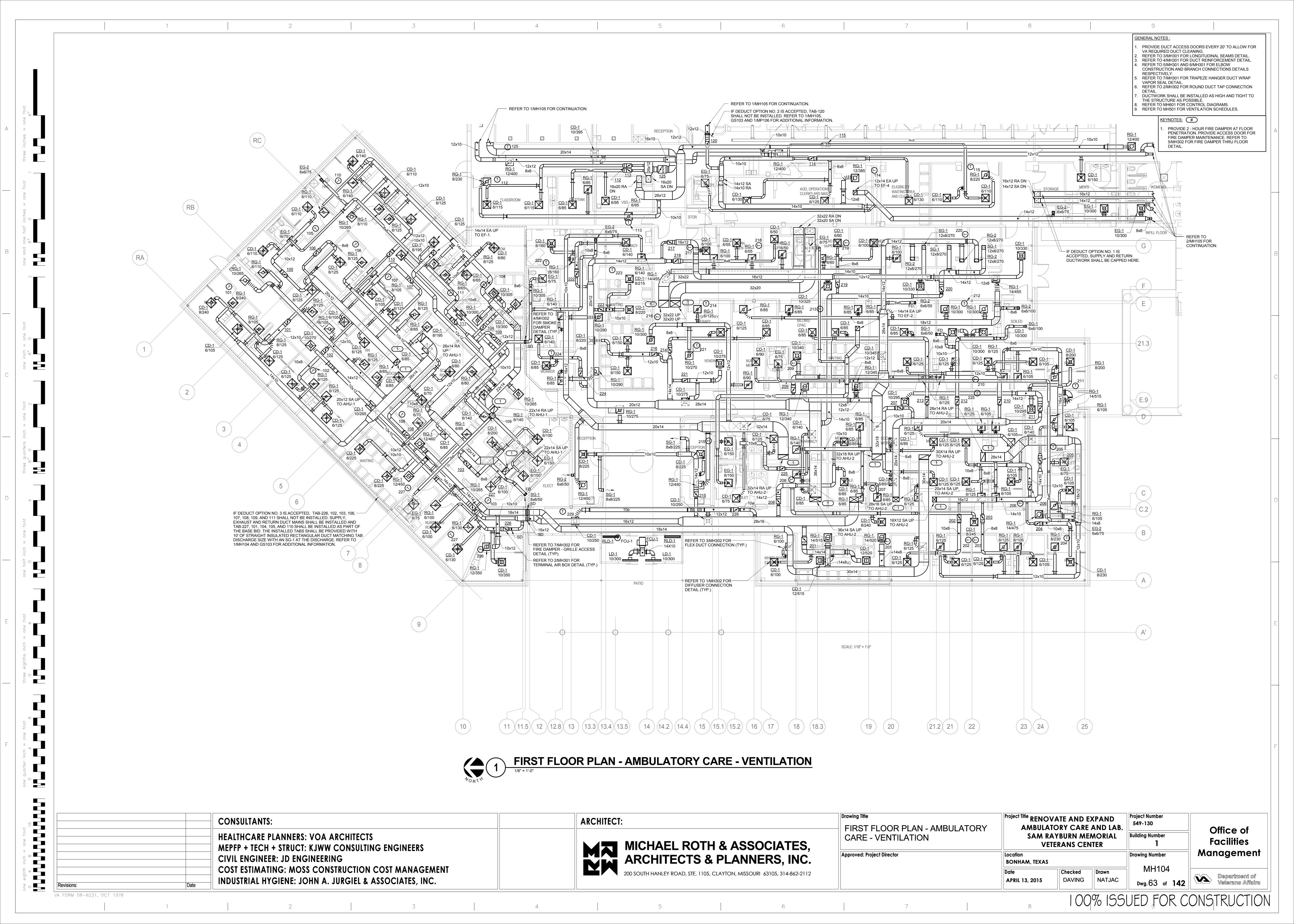






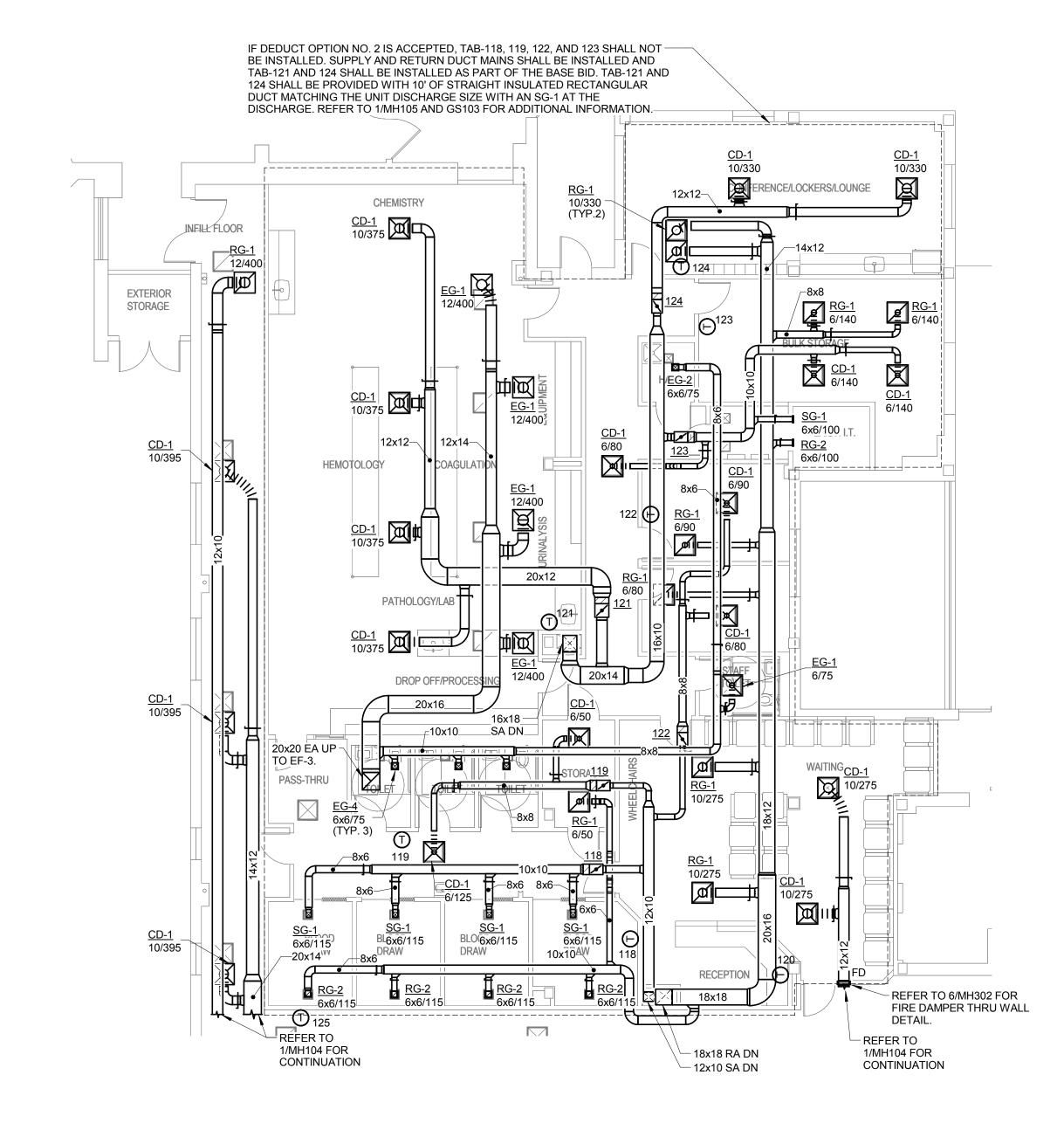
	CONSULTANTS:	ARCHITECT:	Drawing Title BASEMENT FLOOR PLAN -	Project Title RENOVATE AND EXPAND  AMBULATORY CARE AND LA	11 549-130	Office of
	HEALTHCARE PLANNERS: VOA ARCHITECTS  MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS	MICHAEL ROTH & ASSOCIATES.	VENTILATION	SAM RAYBURN MEMORIA VETERANS CENTER	Building Number  1	Facilities
	CIVIL ENGINEER: JD_ENGINEERING	ARCHITECTS & PLANNERS, INC.	Approved: Project Director	Location BONHAM, TEXAS	Drawing Number	Management
Revisions: Date	COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date Checked Drawn NATJA	MH102 Dwg.61 of <b>142</b>	Department of Veterans Affairs
VA FORM 08-6231, OCT 1978						CONCTRICTION





GENERAL NOTES:

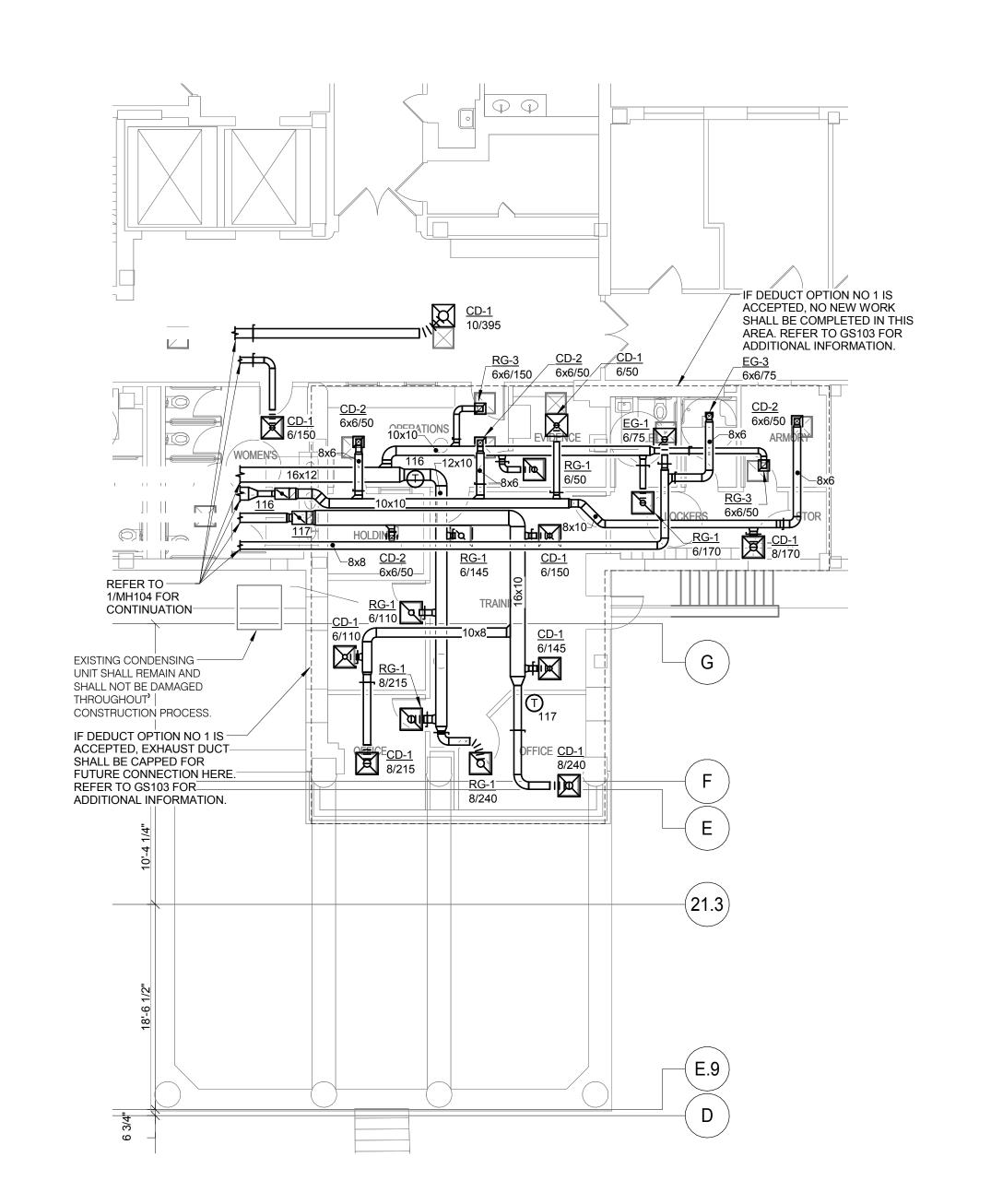
1. PROVIDE DUCT ACCESS DOORS EVERY 20' TO ALLOW FOR VA REQUIRED DUCT CLEANING.
2. DUCTWORK SHALL BE INSTALLED AS HIGH AND TIGHT TO THE STRUCTURE AS POSSIBLE.
3. REFER TO MH601 FOR CONTROL DIAGRAMS.
4. REFER TO MH501 FOR VENTILATION SCHEDULES.



ENLARGED LABORATORY FLOOR PLAN - VENTILATION

1/8" = 1'-0"

VA FORM 08-6231, OCT 1978

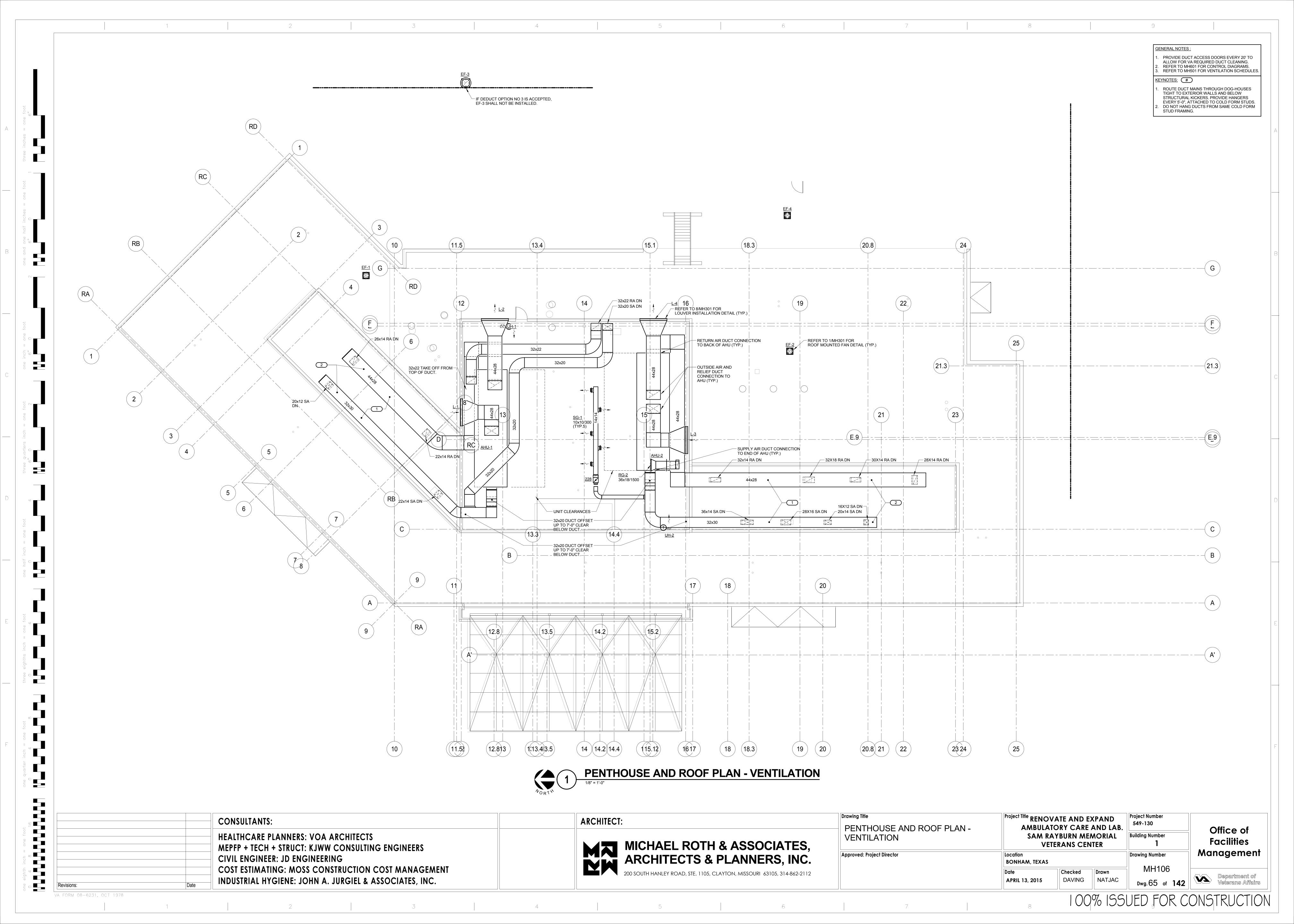


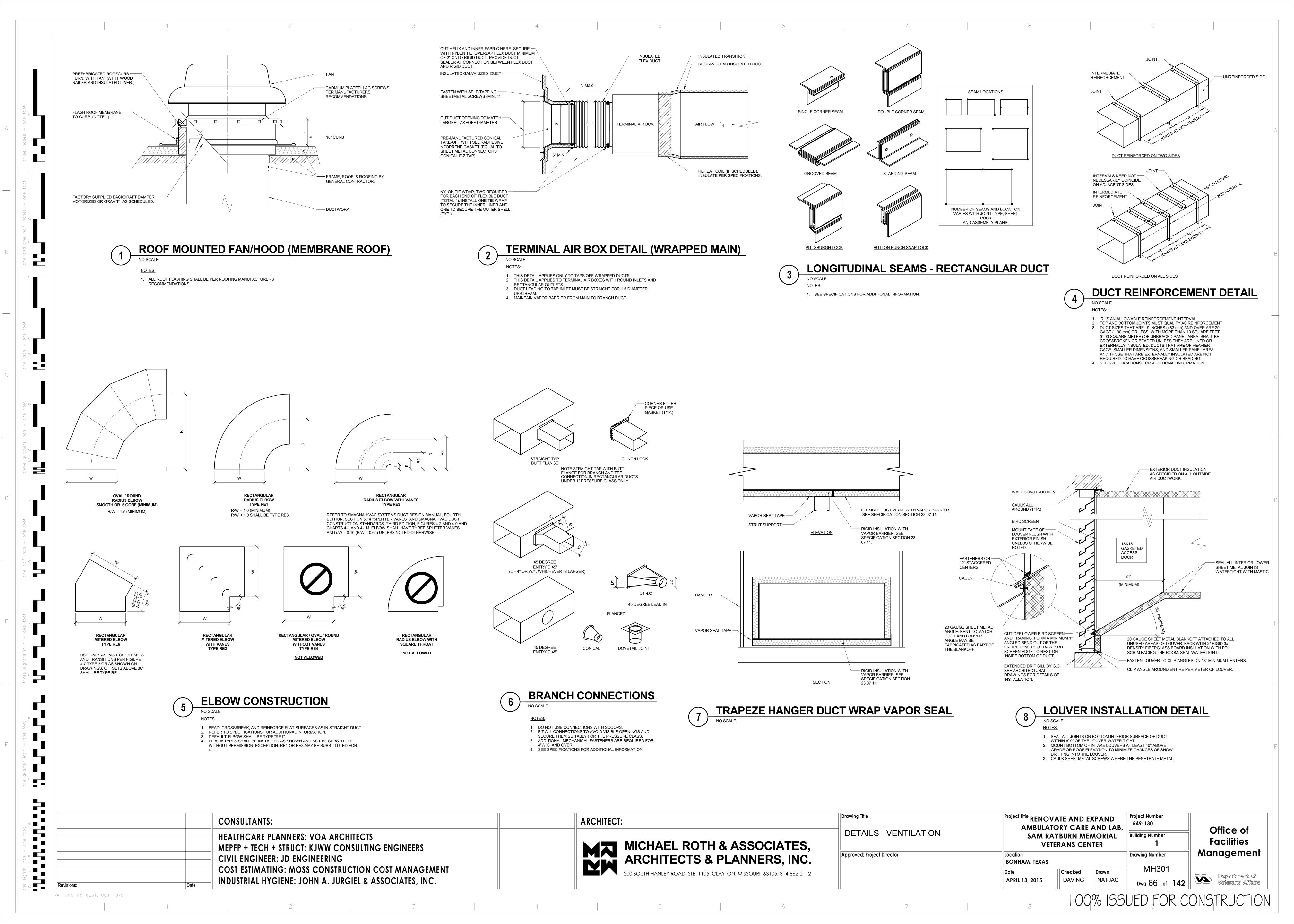
ENLARGED SECURITY FLOOR PLAN - VENTILATION

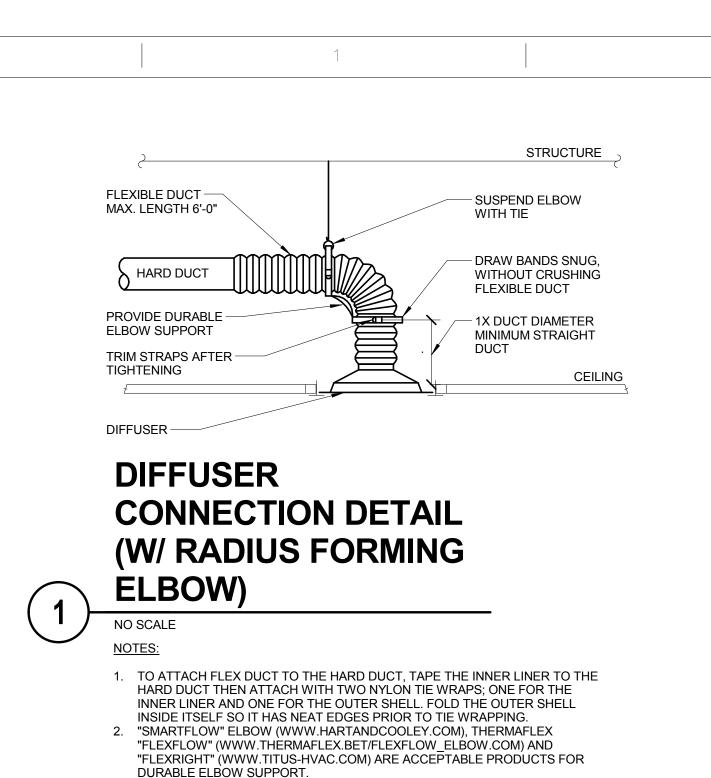
1/8" = 1'-0"

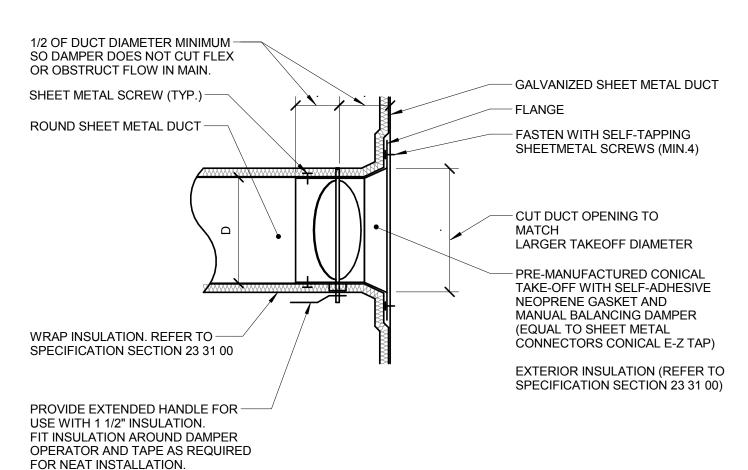
	CONSULTANTS:	ARCHITECT:	Drawing Title ENLARGED FLOOR PLAN -	Project Title RENOVATE AND EXPAND  AMBULATORY CARE AND LAB	Project Number 549-130	Office of
	HEALTHCARE PLANNERS: VOA ARCHITECTS  MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS	MICHAEL ROTH & ASSOCIATES.	LABORATORY AND SECURITY - VENTILATION			Office of Facilities
	CIVIL ENGINEER: JD ENGINEERING COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT	ARCHITECTS & PLANNERS, INC.	Approved: Project Director	Location BONHAM, TEXAS	Drawing Number MH105	Management
Revisions: Date	INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date APRIL 13, 2015 Checked Drawn NATJAC	Dwg. 64 of 142	Department of Veterans Affairs

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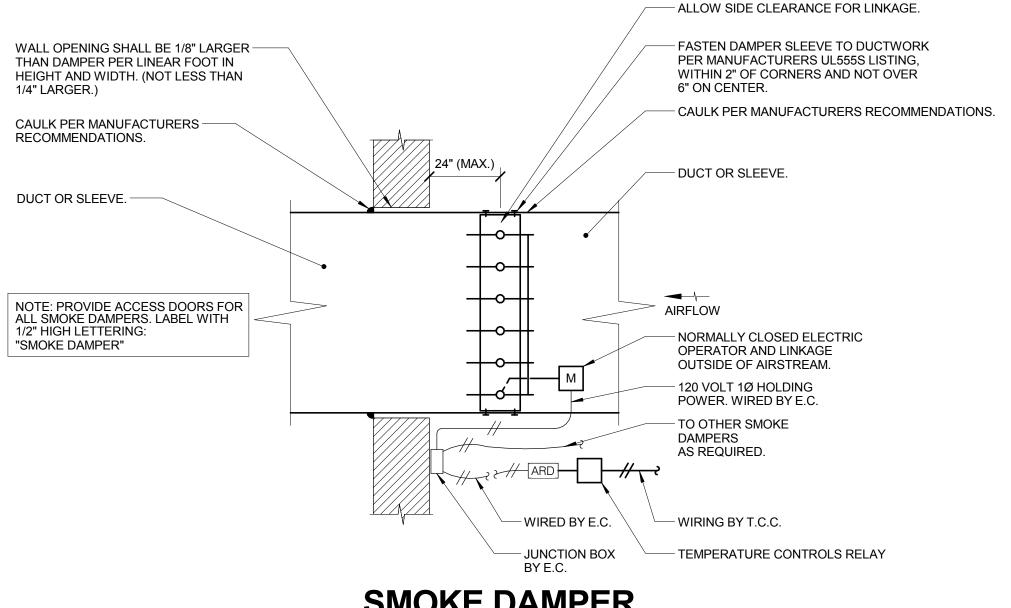








CUT INSIDE CARRIER DUCT AT THIS POINT - GALVANIZED SHEET METAL DUCT - FLANGE WRAP INSULATION. REFER TO — SPECIFICATION SECTION 23 31 00 FASTEN WITH SELF-TAPPING SHEETMETAL SCREWS (MIN.4) - CUT DUCT OPENING TO MATCH LARGER TAKEOFF DIAMETER PRE-MANUFACTURED CONICAL TAKE-OFF WITH SELF-ADHESIVE NEOPRENE GASKET AND MANUAL BALANCING DAMPER (EQUAL TO SHEET METAL INSULATED FLEX DUCT -CONNECTORS CONICAL E-Z TAP) - EXTERIOR INSULATION (SEE SPECIFICATION SECTION 23 31 00) - NYLON TIE WRAP, TWO REQUIRED FOR EACH END OF FLEXIBLE DUCT (TOTAL 2). INSTALL ONE TIE WRAP TO SECURE THE INNER LINER AND ONE TO SECURE THE OUTER SHELL. (TYP.)



ROUND DUCT TAP
CONNECTION

FLOW IN THE MAIN DUCT.

(CONICAL/WRAPPED)

THIS DETAIL APPLIES ONLY TO TAPS OFF UNLINED DUCTS.
 TAP DOES NOT NEED TO BE CONICAL IF THE TAP IS NOT LOCATED BETWEEN FANS AND TERMINAL AIR BOXES, DUCT IS NOT OVER 2" PRESSURE CLASS, AND ROUND DUCT IS NOT OVER 12" DIAMETER.
 MANUFACTURED TAP/DAMPER COMBINATIONS WITH LESS THAN 1/2 DUCT DIAMETER SPACING BETWEEN THE MAIN DUCT AND THE DAMPER SHAFT ARE ACCEPTABLE ONLY IF THE DAMPER SHAFT IS INSTALLED PARALLEL TO THE AIR

FLEX DUCT CONNECTION (CONICAL/WRAPPED)

THIS DETAIL APPLIES ONLY TO TAPS OFF UNLINED DUCTS.
 TAP DOES NOT NEED TO BE CONICAL IF THE TAP IS NOT LOCATED BETWEEN FANS AND TERMINAL AIR BOXES, DUCT IS NOT OVER 2" PRESSURE CLASS, AND ROUND DUCT IS NOT OVER 12" DIAMETER.

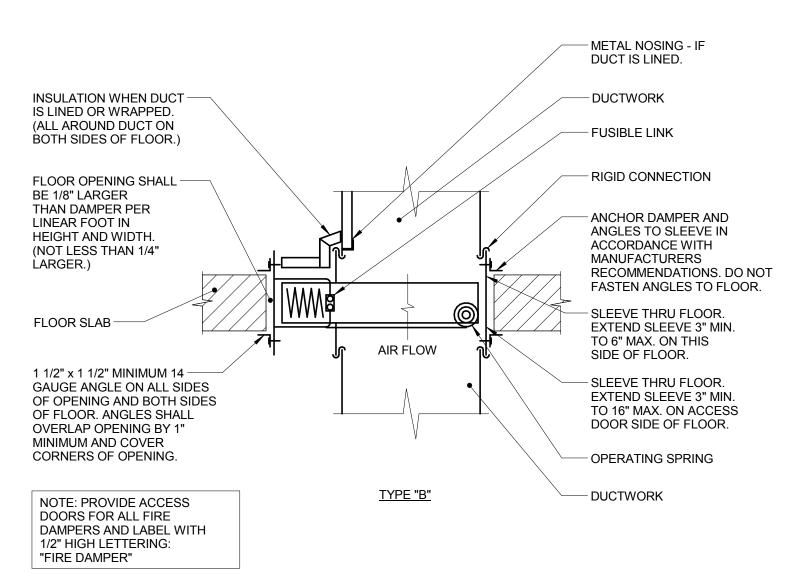
SMOKE DAMPER
DETAIL (ELECTRIC)
NO SCALE

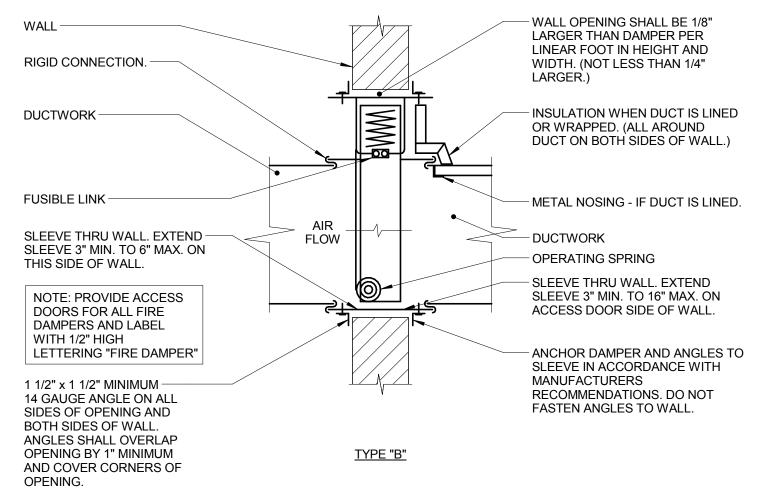
NOTES:

1. SMOKE DAMPER TO BE COMPLETE WITH MOTOR AND LINKAGE.

2. SEE SMOKE DAMPER CONTROLLER SCHEMATIC DETAIL ON ELECTION.

 SEE SMOKE DAMPER CONTROLLER SCHEMATIC DETAIL ON ELECTRICAL DRAWINGS FOR WIRING DETAILS. TCC SHALL PROVIDE RELAYS TO CLOSE FIRE SMOKE DAMPERS IN NON-FIRE EVENTS. REFER TO ELECTRICAL DRAWINGS FOR ARD LOCATIONS.





INSULATION WRAP-- WALL OPENING SHALL BE NO MORE RIGID CONNECTION. THAN 1/2" LARGER THAN THE CONNECTING DUCT SIZE IN HEIGHT METAL NOSING (IF DUCT IS LINED). MINIMUM 26 GAUGE STEEL GRILLE FASTENED TO INTEGRAL SLEEVE FLANGE. DO NOT FASTEN GRILLE DIRECTLY TO WALL. GRILLE SHALL OVERLAP WALL A MINIMUM OF 1/2". FUSIBLE LINK OPERATING SPRING. - ANCHOR DAMPER AND SLEEVE TO WALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CERAMIC FIBER INSULATION — ADHERED TO ALL FOUR SIDES ALONG FULL LENGTH OF SLEEVE. TYPE "B"

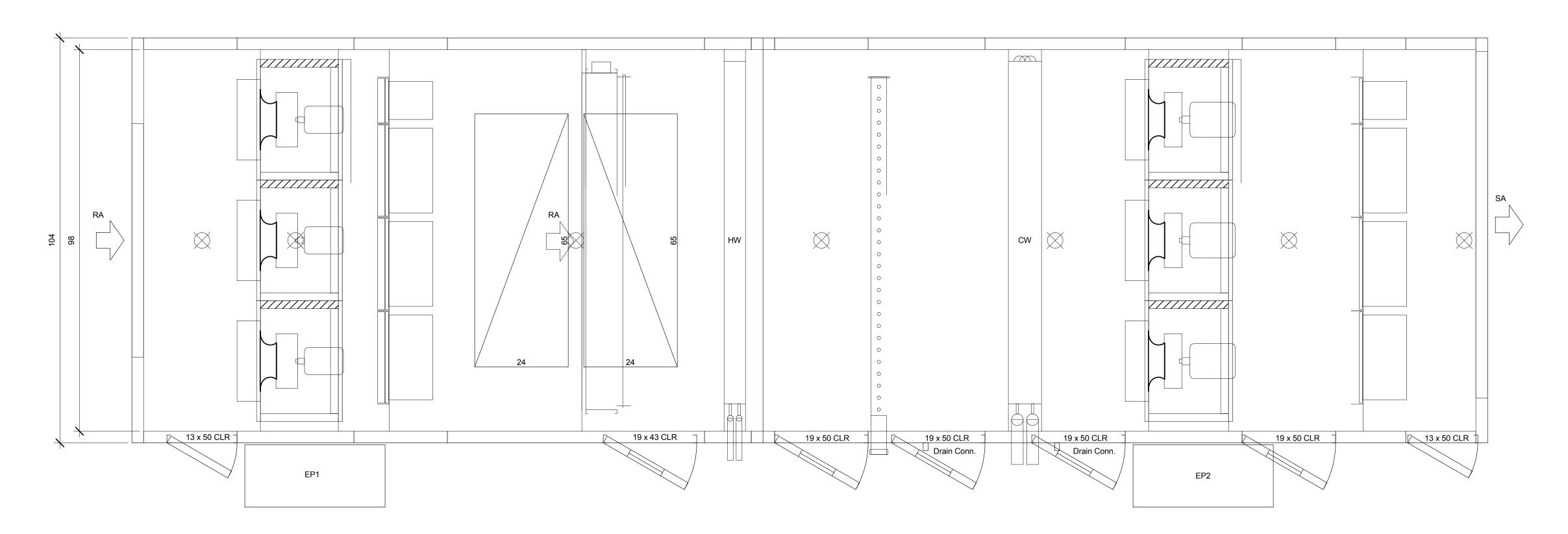
FIRE DAMPER THRU FLOOR DETAIL (TYPE B)

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FIRE DAMPER THRU WALL DETAIL (TYPE B)

7 FIRE DAMPER - GRILLE ACCESS (TYPE B)

Drawing Title Project Title RENOVATE AND EXPAND **CONSULTANTS:** ARCHITECT: 549-130 AMBULATORY CARE AND LAB. Office of **DETAILS - VENTILATION** HEALTHCARE PLANNERS: VOA ARCHITECTS SAM RAYBURN MEMORIAL **Building Number Facilities** MICHAEL ROTH & ASSOCIATES, ARCHITECTS & PLANNERS, INC. **VETERANS CENTER** MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS Management **Approved: Project Director Drawing Number** CIVIL ENGINEER: JD ENGINEERING BONHAM, TEXAS COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT 200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112 INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC. **APRIL 13, 2015** DAVING

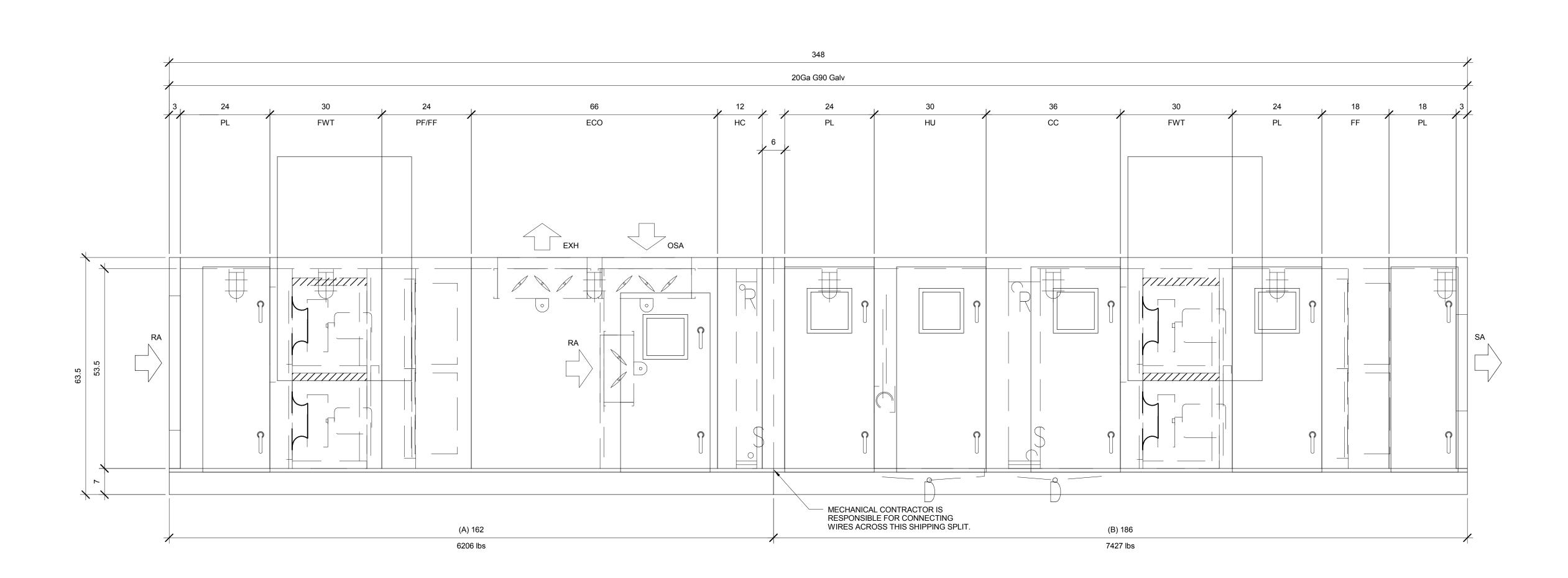


## ENLARGED AHU-1 & AHU-2 DETAIL - PLAN VIEW 3/4" = 1'-0"

NOTES:

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AHU-1 SHALL HAVE MAINTENANCE CLEARANCE AND ACCESS ON THE TOP SIDE OF THE PLAN VIEW. AHU-2 SHALL
HAVE MAINTENANCE CLEARANCE AND ACCESS ON THE BOTTOM SIDE OF THE PLAN VIEW.



## 2 ENLARGED AHU-1 & AHU-2 DETAIL - ELEVATION VIEW

	CONSULTANTS:	ARCHITECT:	Drawing Title  ENLARGED AIR HANDLING UNIT	Project Title RENOVATE AND EXPAND AMBULATORY CARE AND LAB.	Project Number 549-130	
	HEALTHCARE PLANNERS: VOA ARCHITECTS  MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS  CIVIL ENGINEER: JD ENGINEERING	MICHAEL ROTH & ASSOCIATES, ARCHITECTS & PLANNERS, INC.	PLAN  Approved: Project Director	SAM RAYBURN MEMORIAL VETERANS CENTER  Location BONHAM, TEXAS	Building Number  1  Drawing Number	Office of Facilities  Management
Revisions: Date	COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date APRIL 13, 2015  Checked Drawn NATJAC	MH303 Dwg.68 of <b>142</b>	Department of Veterans Affairs

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100% ISSUED FOR CONSTRUCTION

RTU COMPONENTS

REMARKS

SIZE: 70x32

12" MERV 14

2" MERV 8

ECONOMIZER, 52x36

PLENUM TYPE, MIN. 6

PLENUM TYPE, MIN. 6

SUPPLY FAN INLET ISOLATION PLATE PER SECTION 23 73 23

PROVIDE DRAIN PAN IN SECTION

PROVIDE DRAIN PAN IN SECTION

CONDENSATE RETURN OUTLET MINIMUM OF 24" ABOVE BOTTOM OF BASE RAIL

REFER TO AIR BLENDER SCHEDULE FOR BYPASS DAMPER REQUIREMENTS

RETURN FAN INLET ISOLATION PLATE PER SECTION 23 73 23

PROVIDE WALKABLE GRATE OVER OPENING. PROVIDE MIN. OF 28 SF OF FREE AREA.

PROVIDE PRESSURE RELIEF DOOR QUALITY

DUAL VFD WITH BACNET CONTROLLER

PROVIDE AS ADD ALTERNATE #1

DESCRIPTION

SUPPLY AIR DUCT CONNECTION

FINAL FILTERS

SUPPLY FAN

FAN INLET ISOLATION PLATE

COOLING COIL

STEAM HUMIDIFIER

STEAM DISTRIBUTION COIL

PRE-FILTERS

AIR BLENDER

OUTSIDE AIR DAMPER

RETURN AIR DAMPER

EXHAUST AIR DAMPER

FAN INLET ISOLATION PLATE

RETURN FAN

BRASS DAMPER

12"x12" PRESSURE RELIEF DOOR

VDF/CONTROL PANEL

**UV LIGHTS** 

P RETURN AIR INLET FLOOR OPENING

MINIMUM OUTSIDE AIR DAMPER 26x36

## 

	SCHEDULE GENERAL NOTES
	Key Name
A. DISC	ONNECT AND CONTROLLER STARTER FURNISHED AND
INSTAL	LED BY:
MFR = I	MANUFACTURER
EC = El	ECTRICAL CONTRACTOR.
B. DISC	ONNECT TYPE:
NF = NO	DN-FUSED
C. CON	TROLLER STARTER TYPE:
FV = FL	JLL VOLTAGE
VFD = \	/ARIABLE FREQUENCY DRIVE
D. FAN	RPM SHALL NOT EXCEED 110% OF SCHEDULED VALUE,
WITH T	HE SCHEDULED WHEEL TYPE. SUBSTITUTION OF BI OR BIA FANS
FANS F	OR FC IS ACCEPTABLE IF EFFICIENCY IS NOT LOWER.
E. NO E	QUIPMENT SHALL BE SELECTED ABOVE 90% OF MOTOR
NAME F	PLATE RATING.
F. MUS	T BE WITHIN +/- 10% OF SCHEDULED RPM.
G. CUR	B TYPE:
MFR = S	STANDARD CURB BY MANUFACTURER

REFER TO MP501 FOR AIR COOLED CHILLER AND OTHER PIPING EQUIPMENT SCHEDULES.

GENERAL SHEET NOTE:

VA FORM 08-6231, OCT 1978

											F/	AN CO	II LIN	IT SC	HEDIII	LE - HY	DRON	IC.								
																ONTROL SEQ										
				E	AT			COOLIN	G COIL					HEATING						ELE	ECTRICAL					
			EXT. S.P. IN				SENSIBLE				W.P.D. FT.	TOTAL				W.P.D. FT.					DISCO	ONNECT	CONTROLLER/ STARTER			
<b>TAG NAME</b>	AREA SERVED	CFM	W.C.	DB °F	WB °F	TOTAL MBH	MBH	GPM	EWT °F	LWT °F	HD	MBH	GPM	EWT °F	LWT °F	HD	HP	RPM	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	TYPE (NOTE A)	MANUFACTURER	MODEL	NOTES
FCU-1	VESTIBULE G100A	600	0.30	80.0	67.0	16	15	3.8	40	48	4.10	17	1.2	180	150	6.30	0.22	1080	208	1	MFR	NF	MFR	TRANE	FCC060	1

								FAN	SCHED	ULE										
	N	IOTES : 1. PRO	VIDE SHAFT GR	OUNDING AS REC	QUIRED IN THE	MOTOR SPECIFIC	CATION23 0	5 12. 2. REFER TO	MH-601 FOR F	AN-A CO	NTROL SE	QUENCE. 3.	EXHAUST FA	AN SHALL NOT I	BE INSTALLED IF	DEDUCT OPTI	ON NO 2 IS ACCE	PTED.		
														ELECTRICA	Ĺ					
				WHEEL DIA.	FAN RPM		MAX. AMCA	BACKDRAFT	<b>CURB TYPE</b>					DISCO	NNECT	CONTROLL	ER/ STARTER			
TAG NAME	AREA SERVED	CFM	S.P. IN. W.C.	INCHES	(NOTE F)	DRIVE TYPE	SONES	DAMPER TYPE	(NOTE G)	BHP	MHP	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	MANUFACTURER	MODEL	NOTES
EF-1	GENERAL EXHAUST NORTH	675	0.25	9	1550	DIRECT	9	GRAVITY	MFR	0.11	0.125	115	1	MFR	NF	EC	FV	COOK	ACED	NOTES 1, 2, 3
EF-2	GENERAL EXHAUST SOUTH	600	0.25	9	1550	DIRECT	9	GRAVITY	MFR	0.11	0.125	115	1	MFR	NF	EC	FV	COOK	ACED	NOTES 1, 2, 3
EF-3	GENERAL EXHAUST LAB	1900	0.25	13.5	1550	DIRECT	15.7	GRAVITY	MFR	0.44	0.5	115	1	MFR	NF	EC	FV	COOK	ACED	NOTES 1, 2, 3
EF-4	GENERAL EXHAUST G115/G116	900	0.25	9	1550	DIRECT	9	GRAVITY	MFR	0.11	0.125	115	1	MFR	NF	EC	FV	COOK	ACED	NOTES 1, 2, 3

REFER TO SEPARAT	ITHER RADIATED NOR DISCHAI D MH-601 FOR DESCRIPTION OF E FROM BOXES IF REQUIRED T CONTRACTORS. 7. TERMINAL	F CONTROL TYPE. 4.	SENSOR TYPES: 2 - SENS SURE DROP REQUIREMEN	OR WITH ADJUNTS. 6. HEATI	JSTMENT, 4 - NG COIL SEL	SENSOR WITH	H ADJUSTMENT AN LL BE BASED ON A	ND OVERRIDE. 5. HE FIXED LEAVING AIR T	ATING COIL IS BASED ON EMPERATURE AND VARIA	HEATING AIR FLOW. WATER ABLE FLOW (GPM). PROVIDE F	PRESSURE DROP OF REHE	AT COILS SHALL NOT EXE E (GPM) TO TEST & BALA	KCEED 5'. PRO ANCE TERMPE	VIDE REHEAT COILS RATURE CONTROLS
			CFM				HEATING COIL (NO		MIN. INLET SIZE (IN.)					T
TAG NAME	AREA SERVED	COOLING MAX.	HEATING MAX.	MIN.	EAT °F	LAT °F	EWT °F	MAX. GPM	DIA.	CONTROL TYPE (NOTE 3)	SENSOR TYPE (NOTE 4)	MANUFACTURER	MODEL	NOTES
101	B111-EXAM ROOM	470	465	410	55.0	95.0	180	2.1	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
102	B113-MD	250	230	220	55.0	95.0	180	1.0	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
103	G104-MENS TOILET NORTH	450	415	415	55.0	85.0	180	1.4	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2, 9
104	A101-WAITING	605	340	340	55.0	85.0	180	1.2	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2
105	B108-LVN	495	495	405	55.0	95.0	180	2.5	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
106	B106-MD	250	215	215	55.0	85.0	180	0.7	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
107	B105-LVN	460	400	400	55.0	85.0	180	1.3	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
108	B103-SOCIAL WORKER	320	295	295	55.0	85.0	180	1.0	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
109	B101-COPY	615	600	600	55.0	85.0	180	2.0	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
110	A106-EXAM ROOM	375	360	325	55.0	95.0	180	1.6	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
111	A103-MD	360	360	360	55.0	95.0	180	1.6	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
112	G107-CLASSROOM	230	230	230	55.0	85.0	180	0.8	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
113	G109-VSO	180	150	150	55.0	85.0	180	0.5	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
114	G111-AOD, OPERATIONS	385	330	330	55.0	85.0	180	1.1	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
115	G113-CONFERANCE	220	215	215	55.0	85.0	180	0.8	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
116	F102-HOLDING	360	360	305	55.0	95.0	180	1.6	6"	TAB-A	2	TITUS	DESV	NOTES 1, 2, 7
117	F105-OFFICE	860	860	845	55.0	95.0	180	4.2	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 7
118	H105-BLOOD DRAW	460	450	450	55.0	85.0	180	1.5	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 8
119	H111-STORAGE	175	175	175	55.0	85.0	180	0.6	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 8
120	H100-WAITING	550	550	550	55.0	95.0	180	2.4	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2, 8
121	H122-PATHOLOGY LAB	1500	1305	1305	55.0	85.0	180	4.3	12"	TAB-A	4	TITUS	DESV	NOTES 1, 2
122	H115-CHIEF OFFICE	170	135	135	55.0	95.0	180	0.6	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 9
123	H120-CORRIDOR	475	475	475	55.0	95.0	180	2.4	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2, 9
124	H119-CONF LOCKER LOUNGE	660	660	510	55.0	95.0	180	3.3	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
125	G148-EXISTING CORRIDOR	2275	2145	660	55.0	95.0	180	9.3	16"	TAB-A	2	TITUS	DESV	NOTES 1, 2

TERMINAL AIR BOX SCHEDULE - SINGLE DUCT- REHEAT - AHU-2

			CFM				HEATING COIL (NO	TES 5 & 6)	MIN. INLET SIZE (IN.)					
TAG NAME	AREA SERVED	COOLING MAX.	HEATING MAX.	MIN.	EAT °F	LAT °F	EWT °F	MAX. GPM	DIA.	CONTROL TYPE (NOTE 3)	<b>SENSOR TYPE (NOTE 4)</b>	MANUFACTURER	MODEL	NOTES
201	G142-WHEEL CHAIR STORAGE	1135	1135	575	55.0	95.0	180	5.0	12"	TAB-A	4	TITUS	DESV	NOTES 1, 2
202	C103-MD	250	230	220	55.0	95.0	180	1.0	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
203	C105-LVN	230	210	200	55.0	95.0	180	0.9	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
204	C108-LVN	335	315	290	55.0	95.0	180	1.4	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
205	D108-LVN	105	95	90	55.0	95.0	180	0.5	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
206	D106-LVN	600	520	520	55.0	85.0	180	1.8	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
207	D104-MD	420	365	365	55.0	85.0	180	1.2	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
208	D102-MENTAL HEALTH PROFESSIONAL	880	880	880	55.0	85.0	180	2.9	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
209	D116-NURSE MED	775	515	515	55.0	85.0	180	1.7	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
210	D113-MD	480	415	415	55.0	85.0	180	1.4	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
211	D109-EXAM ROOM	790	785	430	55.0	95.0	180	3.5	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
212	G135-SOILED UTILITY	450	450	440	55.0	85.0	180	1.5	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
213	G130-BILLING	255	200	200	55.0	85.0	180	0.7	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
214	G128-EKG	250	230	230	55.0	85.0	180	0.8	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
215	G100B-RECEPTION LOBBY	900	315	315	55.0	85.0	180	1.1	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
216	G105-WAITING	520	490	490	55.0	85.0	180	1.7	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2
217	G126-CORRIDOR	1085	825	825	55.0	85.0	180	2.8	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2
218	G132-CLEAN SUPPLY	105	100	100	55.0	85.0	180	0.5	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
219	G122-LEAD MED SUPERVISOR	160	155	155	55.0	85.0	180	0.5	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
220	NEW-IT	810	175	175	55.0	85.0	180	0.6	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
221	G138-VENDING	550	505	505	55.0	85.0	180	1.7	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2
222	G106-PHARMACY	300	300	300	55.0	85.0	180	1.0	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
223	E101A-WAITING	435	275	275	55.0	85.0	180	0.9	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2
224	E106-SOCIAL WORKER	225	175	175	55.0	85.0	180	0.6	6"	TAB-A	4	TITUS	DESV	NOTES 1, 2
225	G141-TOILET	275	70	70	55.0	85.0	180	0.5	6"	TAB-A	2	TITUS	DESV	NOTES 1, 2
226	B118-ACOS	580	575	350	55.0	95.0	180	2.5	8"	TAB-A	4	TITUS	DESV	NOTES 1, 2, 7
227	B114-WAITING	985	985	985	55.0	95.0	180	4.3	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2
228	PENTHOUSE	1500	1500	1500	55.0	95.0	180	6.6	12"	TAB-A	4	TITUS	DESV	NOTES 1, 2
229	ENTRANCE CORRIDOR	500	500	250	55.0	95.0	180	1.7	8"	TAB-A	2	TITUS	DESV	NOTES 1, 2

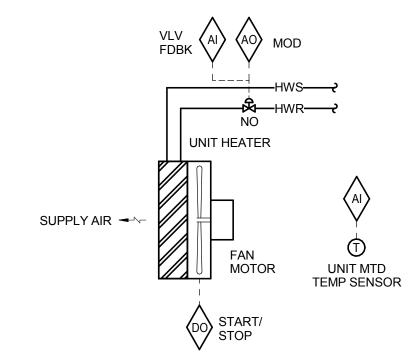
	225	G141-TOILET	275	70	70	55.0	85.0	180	0.5	6"	TAB-A		2	TITU	US DE	SV NOTES 1, 2
	226	B118-ACOS	580	575	350	55.0	95.0	180	2.5	8"	TAB-A		4	TITU	US DE	SV NOTES 1, 2, 7
	227	B114-WAITING	985	985	985	55.0	95.0	180	4.3	8"	TAB-A		2	TITU	US DE	SV NOTES 1, 2
	228	PENTHOUSE	1500	1500	1500	55.0	95.0	180	6.6	12"	TAB-A		4	TITU	US DE	
	229 ENTR	ITRANCE CORRIDOR	500	500	250	55.0	95.0	180	1.7	8"	TAB-A		2	TITU	US DE	SV NOTES 1, 2
LINEAR DIFFUSER SCHEDULE						LIN	IIT HEATE	R SCHE	DULE - HOT	WATER						
LINEAR DILI GOLIN GOLILDOLL						O I V										
NOTES A CONTRACTOR CHAIL RETERMINE PROPER MARCHINE TO MATCH CELLING CONCERNED AS PROVIDE WITH CONCERNED AS REPORTED AS REPORTE										EL	LECTRICAL					
NOTES: 1. CONTRACTOR SHALL DETERMINE PROPER MARGIN STYLE TO MATCH CEILING CONSTRUCTION. 2. PROVIDE WITH CONCEALED FASTNERS. 3. DIRECT ALL SLOTS STRAIGHT DOWN TO WASH EXTERIOR.										EL	LECTRICAL DISCON	NECT	CONTROLLER	R/ STARTER		
							W.P.D. FT.				DISCON	TYPE				
PLENUM PATTERN BALANCING	TAG NAME AREA SERVE	VED CONFIGURATION	CFM	мвн дрм	EWT °F	LWT °F	W.P.D. FT. HEAD	НР	RPM VOI	TAGE PHASES	DISCON	TYPE			IANUFACTURER	MODEL NOTES
PLENUM PATTERN BALANCING	UH-1 PENTHOUSE	ISE HORIZONTAL	<b>CFM</b> 900	MBH         GPM           36         3.6	<b>EWT</b> ° <b>F</b> 180	<b>LWT °F</b> 160	W.P.D. FT. HEAD 0.1	<b>HP</b> 0.17	<b>RPM VO</b> I		DISCON	TYPE			IANUFACTURER TRANE	MODEL NOTES
PLENUM PATTERN BALANCING NUMBER OF PLENUM INSULATION PLENUM CONTROL DAMPER		ISE HORIZONTAL			400	100	W.P.D. FT. HEAD 0.1 0.1	HP 0.17 0.17			BY (NOTE A)	TYPE			TD 4115	
TAG NAME MATERIAL SLOT WIDTH SLOTS WIDTH LENGTH REQUIRED TYPE INLET SIZE REQUIRED FINISH MANUFACTURER MODEL REMARKS	UH-1 PENTHOUSE	ISE HORIZONTAL	900		400	160	W.P.D. FT. HEAD 0.1 0.1	HP 0.17 0.17			BY (NOTE A)  MFR	TYPE	BY (NOTE A)  MFR	CONTROL MA	TRANE	UHS

				LOL	JVER SC	HEDULE				
<b>EPOXY FINISH</b>	I ON PRIME COATED METAL		R - SELECTIÓN	BY ARCHITECT.	TYPE 5 - DUR	H ON PRETREATED PRIME PAI RANODIC BRONZE - LIGHT, ME EXISTING CRAWL SPACE. NO	DIUM, DARK TY	PE 6 - PVDF (KYNAR 5	00, HYLAR 5000	
			SIZE (II	NCHES)	FREE AREA					
TAG NAME	AREA SERVED	CFM	WIDTH	HEIGHT	VELOCITY	S.P. IN. W.C.	FINISH	MANUFACTURER	MODEL	NOTES
L-1	OUTSIDE AIR AHU-1	13000	84	48	900	0.18	TYPE 2	RUSKIN	ELF375DX	NOTE 2
L-2	EXHAUST AIR AHU-1	13000	84	36	1200	0.25	TYPE 2	RUSKIN	ELF375DX	NOTE 2
L-3	OUTSIDE AIR AHU-2	13000	84	48	900	0.18	TYPE 2	RUSKIN	ELF375DX	NOTE 2
L-4	EXHAUST AIR AHU-2	13000	84	36	1200	0.25	TYPE 2	RUSKIN	ELF375DX	NOTE 2
L-5	EXISTING CRAWLSPACE	NATURAL VENT	36	12	N/A	0.05	TYPE 2	RUSKIN	ELF375DX	NOTE 1 & 2

	GRILLES REGISTERS & DIFFUSERS SCHEDULE													
TAG NAME	NOTES: 1.	CONTRACTOR SHALL DETER CONFIGURATION	MARGIN (NOTE 1)	R MARGIN STYLE T INLET SIZE (IN.) (NOTE 2)	FACE SIZE (IN.)	ING CONSTRUC VOLUME DAMPER REQUIRED	TION. 2. ALL I	RUN OUT DUCTWORK TO  MANUFACTURER	DIFFUSERS S  MODEL	HALL BE NECK SIZE UNLESS OTHERWISE NOTED.  NOTES				
CD-1	STEEL	PANEL FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	OMNI	FLUSH FACE PANEL				
CD-2	STEEL	LATTICE FACE	1 1/4"	SEE DWG.	12x12	NO	WHITE	PRICE	MSD	SECURITY TYPE FIXTURE				
EG-1	STEEL	PERFORATED FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	PXP	DUCTED EXHAUST				
EG-2	STEEL	35 DEGREE DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	350R					
EG-3	STEEL	LATTICE FACE	1 1/4"	SEE DWG.	9x9	NO	WHITE	PRICE	MSPG	SECURITY TYPE FIXTURE				
EG-4	STEEL	35 DEGREE DEFLECTION	1 1/4"	SEE DWG.	INLET +2	YES	WHITE	TITUS	350R					
RG-1	STEEL	PERFORATED FACE	LAY-IN	SEE DWG.	24x24	NO	WHITE	TITUS	PXP	DUCTED RETURN				
RG-2	STEEL	35 DEGREE DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	350R	DUCTED RETURN				
RG-3	STEEL	LATTICE FACE	1 1/4"	SEE DWG.	12x12	NO	WHITE	PRICE	MSPG	SECURITY TYPE FIXTURE				
SG-1	STEEL	DOUBLE DEFLECTION	1 1/4"	SEE DWG.	INLET +2	NO	WHITE	TITUS	300R	FRONT BLADES VERTICAL UNLESS NOTED OTHERWISE				

	CONSULTANTS:	ARCHITECT:	Drawing Title	Project Title RENOVATE AND EXPAND  AMBULATORY CARE AND LAB		
	HEALTHCARE PLANNERS: VOA ARCHITECTS  MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS	MICHAEL ROTH & ASSOCIATES, ARCHITECTS & PLANNERS, INC.	MECHANICAL SCHEDULES			Office of Facilities
	CIVIL ENGINEER: JD ENGINEERING COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT		Approved: Project Director	Location BONHAM, TEXAS	Drawing Number MH501	Management
Revisions: Date	INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date APRIL 13, 2015  Checked Drawn NATJAC	Dwg. 69 of <b>142</b>	Department of Veterans Affairs

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SEQUENCE OF OPERATION:

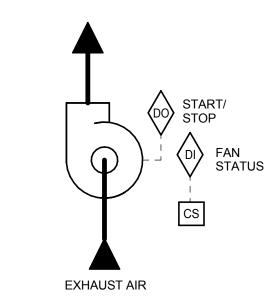
WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 45°F (ADJ.),
TEMPERATURE SENSOR SHALL ENERGIZE FAN AND MODULATE THE
HEATING WATER CONTROL VALVE TO MAINTAIN A SPACE TEMPERATURE
OF 70°F (ADJ.). WHEN SPACE TEMPERATURE IS SATISFIED THE FAN
SHALL TURN OFF.

WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 45°F (ADJ.),
TEMPERATURE SENSOR SHALL MODULATE THE HEATING WATER
CONTROL VALVE TO MAINTAIN A SPACE TEMPERATURE OF 70°F (ADJ.)
AND THE UNIT FAN SHALL RUN CONTINUOUSLY.

ALARMS, INTERLOCKS & SAFETIES:

SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF SPACE
TEMPERATURE FALLS 10°F (ADJ.) BELOW SETPOINT.

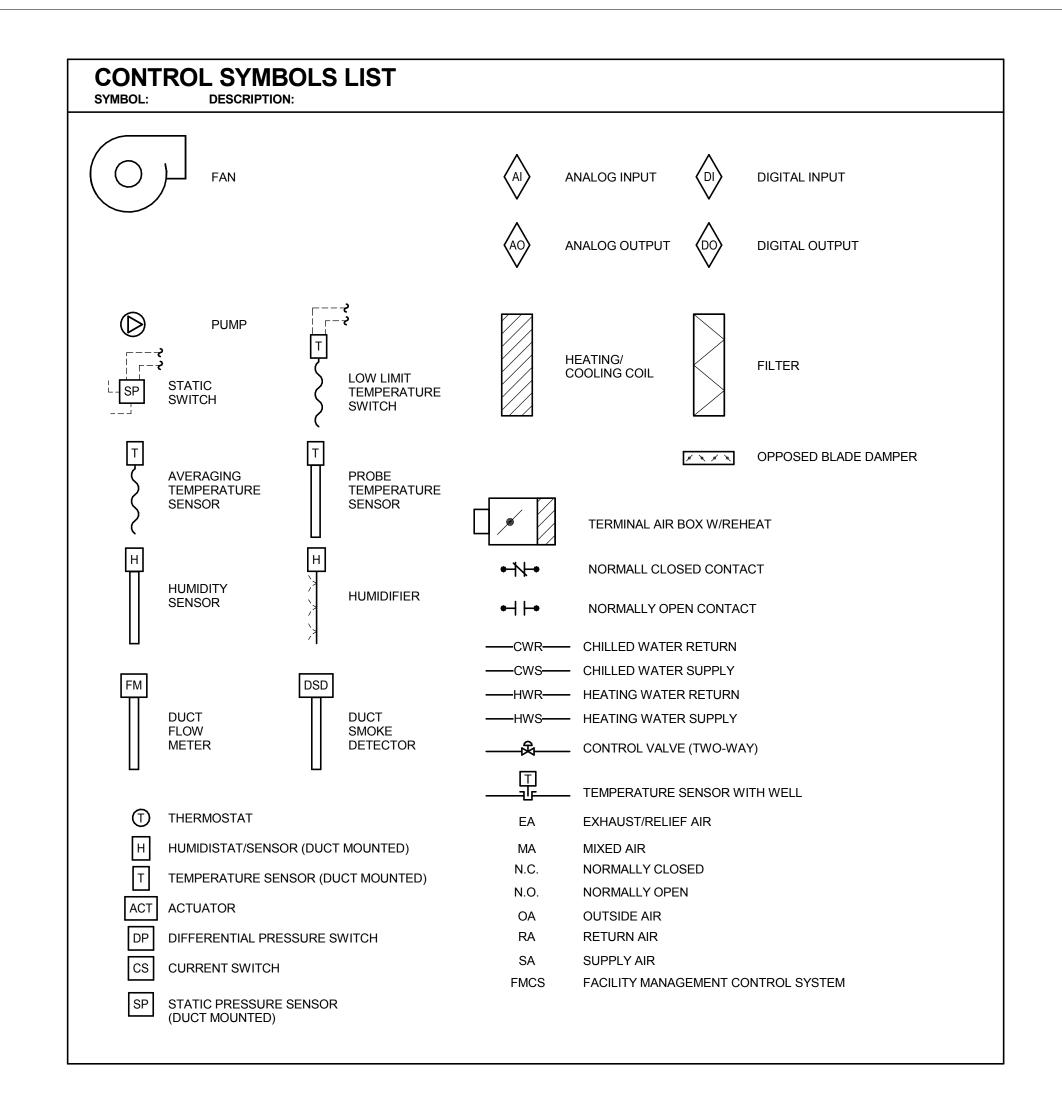
1 UNIT HEATER CONTROL - HOT WATER



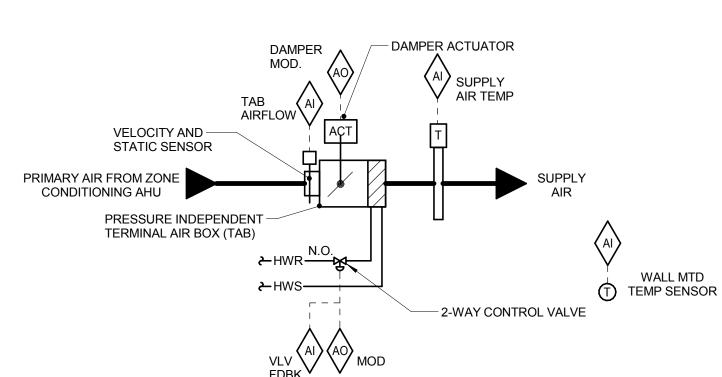
SEQUENCE OF OPERATION:
EXHAUST FAN SHALL BE INTERLOCKED TO RUN CONTINUOUSLY WHEN RESPECTIVE AHU IS OPERATING.

ALARMS, INTERLOCKS AND SAFETIES:
AN ALARM SHALL BE GENERATED AT THE FMCS OPERATOR WORKSTATION IN THE EVENT THE FMCS COMMANDS THE EXHAUST FAN TO OPERATE AND THE CURRENT SENSING RELAY DETECTS INSUFFICIENT CURRENT DRAW.

2 EXHAUST FAN CONTROL - FAN-A
NO SCALE



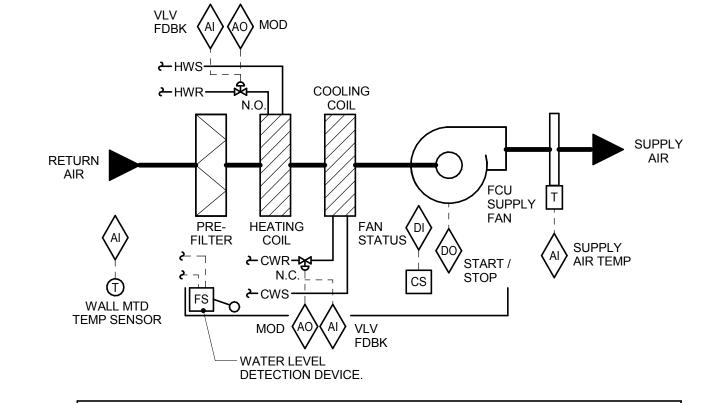
<u>GENERAL CONTROL NOTES:</u>
1. REFER TO EQUIPMENT SCHEDULES TO CROSS REFERENCE WHICH CONTROL DIAGRAMS APPLY TO WHICH ITEMS OF EQUIPMENT. REFER TO TERMINAL AIR BOX (TAB) SCHEDULES FOR TEMP SENSOR REQUIREMENTS FOR EACH TAB. EACH D.I., D.O., A.I. AND A.O. POINT SHOWN FOR ALL CONTROL DIAGRAMS SHALL BE DISCRETE FROM ALL OTHER POINTS EXCEPT AS SPECIFICALLY NOTED. ALL WIRING, CONTROL COMPONENTS, DEVICES AND PROGRAMMING SHOWN ON THESE CONTROL DRAWINGS SHALL BE PROVIDED BY THE TCC UNLESS SPECIFICALLY NOTED OTHERWISE. ALL ACTUATORS SHALL BE OF THE ELECTRICAL TYPE FOR THIS PROJECT. ALL MODULATING DAMPER AND VALVE ACTUATORS SHOWN WITH POSITION FEEDBACK SHALL HAVE THE VALVE POSITION DISPLAYED ON GRAPHICAL SCREEN ADJACENT TO THE DAMPER/VALVE COMMAND SIGNAL. DISPLAYED VALVE POSITION SHALL BE FROM THE FEEDBACK DEVICE/CIRCUIT (OUTPUT SIGNAL FROM THE FMCS TO THE ACTUATOR IS NOT ACCEPTABLE) MODULATING SIGNALS SHALL BE DISPAYED AS % OPEN (SIGNALS DISPLAYED AS % CLOSED ARE NOT ACCEPTABLE). PRESSURE TRANSMITTERS WHOSE SIGNAL IS UTILIZED FOR MAINTAINING DUCT STATIC PRESSURE SHALL BE WIRED DIRECTLY TO THE CONTROLLER WHICH MODULATES FAN SPEED. SIGNAL SHALL BE COMPLETELY INDEPENDENT OF THE FMCS NETWORK. ALL CONTROL COMPONENTS SUCH AS RELAYS, SWITCHES, DDC CONTROLLERS, ETC. SHALL BE MOUNTED IN STEEL ENCLOSURES WITH STEEL MOUNTING BACKPLATES PER SPECIFICATION 23 09 23. EACH CONTROL PANEL SHALL HAVE A LAMINATED COPY OF THE APPLICABLE SEQUENCE OF OPERATION AND CONTROL DIAGRAM INDICATING THE POINTS, COMPONENTS AND OPERATION OF EQUIPMENT ASSOCIATED WITH EACH PANEL. REFER TO SECTION 23 09 23 FOR ADDITIONAL REQUIREMENTS. . TCC SHALL WIRE THE CONTROL SIGNAL FROM THE ASSOCIATED AIR HANDLING UNIT AHU CONTROL PANEL TO CONTROL THE OPERATION OF SMOKE DAMPERS IN ACCORDANCE WITH SEQUENCE OF OPERATION. TCC SHALL PROVIDE ALL WIRING, CONDUIT, TRANSFORMERS, FUSING AND ALL OTHER ELECTRICAL COMPONENTS REQUIRED FOR COMPLETE INSTALLATION. TCC SHALL EXTEND CONTROL SIGNAL FROM ADDRESSABLE RELAY DEVICE SERVING EACH AIR HANDLING UNIT. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS. TCC SHALL EXTEND AND TERMINATE WIRING AS REQUIRED FOR EQUIPMENT SHUTDOWN. 2. TCC SHALL EXTEND 24 VOLT POWER FROM CONTROL POWER SHOWN ON FLOOR PLANS TO ALL TERMINAL AIR BOX CONTROLLERS JUNCTION BOX. TCC SHALL PROVIDE ALL WIRING, SUPPORTS, FUSING SPACE, TOGGLE SWITCHES, AND ALL OTHER ELECTRICAL COMPONENTS REQUIRED FOR COMPLETE INSTALLATION. . TCC SHALL PROVIDE THERMOSTATS FOR AUTOMATIC CONTROL OF EQUIPMENT AS REQUIRED BY THESE CONTROL DRAWINGS. THERMOSTAT CONTACT AMP RATING SHALL BE MINIMUM 125% OF THE MAX. CURRENT DRAW FOR THE EQUIPMENT BEING SERVED. WHERE THERMOSTATS CONTROL THE STARTING OF MOTORS (I.E. FANS), THERMOSTATS SHALL BE RATED FOR MOTOR STARTING APPLICATIONS. 4. ELEMENT LENGTHS FOR BOTH MIXED AIR TEMP SENSORS AND LOW LIMIT TEMP SWITCHES SHALL BE MINIMUM 1 LINEAR FOOT PER SQUARE FOOT OF COIL SURFACE AREA. PROVIDE MULTIPLE SENSORS AND SWITCHES AS NEEDED TO ACHIEVE REQUIRED ELEMENT LENGTHS. LOCATE RESET SWITCHES MAX. 6'-6" ABOVE ADJACENT STANDING SURFACE (I.E. FLOOR) SO THE RESET SWITCH CAN BE CYCLED WITHOUT THE NEED FOR A LADDER. . CONTROL DIAGRAMS ARE SCHEMATIC IN NATURE AND DO NOT SHOW ALL REQUIRED CONTROL DEVICES AND COMPONENTS. REFER TO FLOOR PLANS, FLOW DIAGRAMS AND DETAILS FOR ADDITIONAL CONTROL DEVICES, COMPONENTS AND REQUIREMENTS NOT SHOWN ON THESE CONTROL DRAWINGS. 6. TCC SHALL PROVIDE ALL CONTROL COMPONENTS AND ACCESSORIES AS REQUIRED FOR EQUIPMENT TO BE CONTROLLED AS DESCRIBED IN THE SEQUENCE OF OPERATION REGARDLESS OF WHETHER ALL CONTROL COMPONENTS OR POINTS ARE SHOWN IN THE ASSOCIATED CONTROL DIAGRAM.



**SEQUENCE OF OPERATION**: FMCS TAB CONTROLLER SHALL MODULATE THE TAB DAMPER AND TAB HW REHEAT COIL CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE OF 72°F (ADJ.) WITH 2°F (ADJ.) DEAD BAND BASED ON A SIGNAL FROM A WALL MOUNTED TEMPERATURE SENSOR. SEE DRAWINGS FOR TEMPERATURE SENSOR REQUIREMENTS. SPACES WITH ADJUSTABLE THERMOSTATS WILL ALLOW A +/- 3°F (ADJ.) OFFSET FROM THE DDC SETPOINT. AT FULL COOLING, THE TAB SHALL BE OPEN TO MAXIMUM CFM POSITION. THE REHEAT COIL CONTROL VALVE SHALL BE CLOSED. UPON A FALL IN SPACE TEMPERATURE, THE TAB SHALL MODULATE CLOSED UNTIL SPACE SETPOINT IS MAINTAINED, OR UNTIL IT REACHES ITS MINIMUM SCHEDULED CFM POSITION PER THE TAB SCHEDULE. THE REHEAT COIL CONTROL VALVE SHALL BE CLOSED. UPON A FURTHER FALL IN SPACE TEMPERATURE, THE REHEAT COIL CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE SETPOINT UNTIL THE SUPPLY AIR TEMPERATURE IS 15°F ABOVE ROOM TEMPERATURE SETPOINT. UPON A FURTHER FALL IN SPACE TEMPERATURE. TAB SHALL OPEN TO MAINTAIN SETPOINT UNTIL TAB AIRFLOW REACHES ITS MAXIMUM HEATING SETTING. THE REHEAT CONTROL VALVE SHALL CONTINUE TO MODULATE OPEN TO MAINTAIN MAXIMUM DELTA T LISTED ABOVE. IF ASSOCIATED AHU IS IN COOLING OR ECONOMIZER MODE, THE TAB SHALL CLOSE TO MINIMUM SCHEDULED AIRFLOW POSITION WHEN REHEAT CONTROL VALVE IS OPEN TO PREVENT SIMULTANEOUS HEATING AND COOLING. THE FMCS SHALL UTILIZE OUTPUT FROM ALL TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE. ALARMS, INTERLOCKS & SAFETIES: SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE SPACE TEMPERATURE IS MORE THAN 10°F (ADJ.) ABOVE OR BELOW SETPOINT.

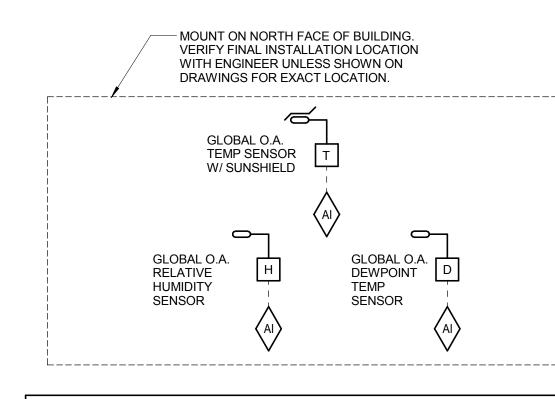
TAB CONTROL W/ HOT WATER REHEAT - TAB-A

VA FORM 08-6231, OCT 1978



SEQUENCE OF OPERATION:
SUPPLY FAN OPERATION SHALL BE CONTROLLED BY THE FMCS THROUGH A CONTACTOR. THE UNIT SHALL MAINTAIN A ROOM AIR TEMPERATURE SETPOINT. WHENEVER THE ROOM AIR TEMPERATURE IS 2°F (ADJ.) ABOVE THE SETPOINT, THE FOLLOWING SHALL OCCUR: THE HEATING COIL CONTROL VALVE SHALL BE CLOSED. THE CHILLED WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE SETPOINT. WHENEVER THE ROOM AIR TEMPERATURE IS 2°F (ADJ.) BELOW THE SETPOINT, THE FOLLOWING THE CHILLED COIL CONTROL VALVE SHALL BE CLOSED. THE HEATING WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE SETPOINT. IF ROOM AIR TEMPERATURE IS MAINTAINED AND BOTH THE HEATING AND COOLING COIL ARE VALVES CLOSED, THE SUPPLY FAN SHALL BE DE-ENERGIZED. IF EITHER OF THE COIL CONTROL VALVES OPEN, THE SUPPLY FAN SHALL BE ENERGIZED. WHEN THE FIRE ALARM CONTROL PANEL INDICATES AN ALARM CONDITION, FCU SHALL A WATER LEVEL DETECTION DEVICE SHALL CLOSE THE CHILLED WATER VALVE AND PREVENT SUPPLY FAN OPERATION UPON DETECTION OF HIGH WATER LEVEL AND SHALL INDICATE AN ALARM TO THE OPERATOR WORKSTATION. FMCS SHALL INDICATE AN ALARM TO THE FMCS OPERATOR WORKSTATION IF THE FMCS COMMANDS THE SUPPLY FAN TO OPERATE AND THE FAN CURRENT RELAY DETECTS INSUFFICIENT CURRENT FLOW. WHENEVER FCU IS SHUTDOWN THE FOLLOWING SHALL OCCUR: HEATING AND CHILLED WATER CONTROL VALVE SHALL. SUPPLY FAN SHALL BE DE-ENERGIZED.

FAN COIL UNIT CONTROL - FCU-A
NO SCALE



SEQUENCE OF OPERATION:
PROVIDE GLOBAL O.A. DRY-BULB TEMPERATURE, GLOBAL O.A. DEWPOINT TEMPERATURE, AND RELATIVE HUMIDITY TRANSMITTERS.

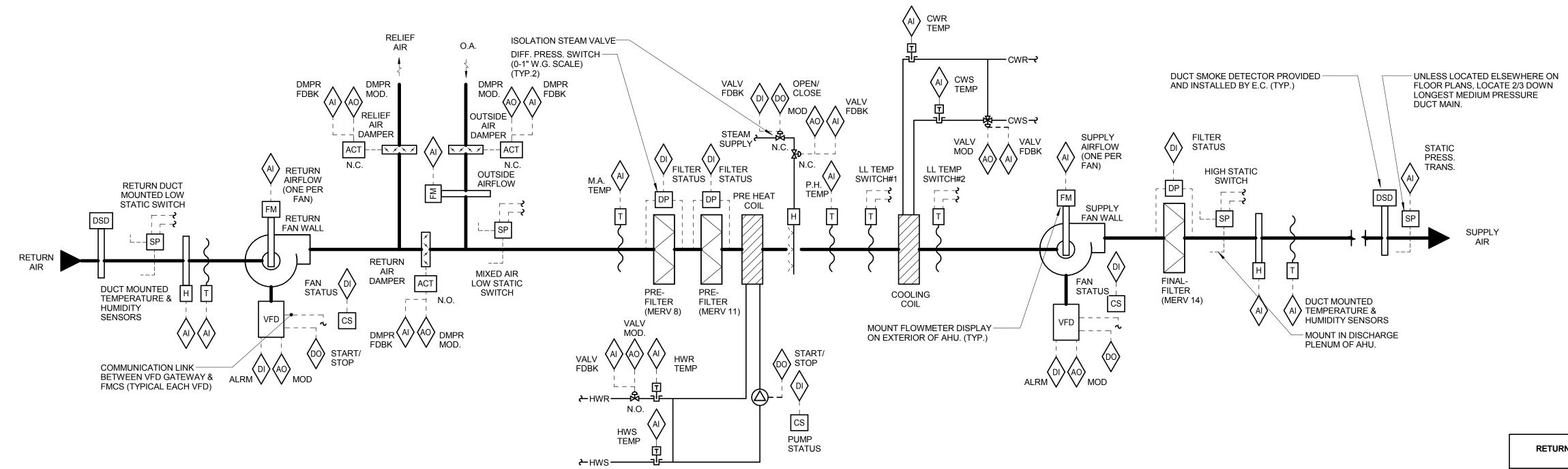
GLOBAL SENSORS SHALL CONTINUOUSLY UPDATE FMCS FOR USE IN CONTROLLING MECHANICAL EQUIPMENT AS REQUIRED IN SEQUENCES OF OPERATION.

GLOBAL REFERENCE POINTS

DDC FMCS COMMAND	AIR BOX REPORT HO SHALL BE PROGRAI FROM THE DDC FMO COMMAND THE DDO	MMED TO GE	NERATE THE ATION BY CLIC	FOLLOWING RECKING ON A GRA	APHICAL BUTT	
TAB/COIL SYMBOL ***				SUP AIR TEMP (DEG. F) 65.2 75.1	ROOM TEMP (DEG. F) 73.6 71.1	ROOM SETPOINT (DEG. F) 72.0 72.0
REPORT SI	THE SAMPLE REPOR HALL LIST ALL TABS, MED FOR EACH AHU	COILS SERV				
	REPORT PRINTS O THE INDIVIDUAL TA				C FMCS SHALL	. AUTOMATICALLY
AUTOMATIO	NTING THE SUM OF CALLY PRINT OUT TH TING COILS LISTED I	HE AIR HAND	LER REPORT			
AUTOMATION (E.G. A SIN	SHALL ALLOW THE CALLY CHANGE THE GLE COMMAND WILI NG COIL SETPOINT (	LOCAL SETF SET ALL TA	POINT FOR EA BS/HEATING (	CH TAB SERVE COILS SERVED I	D BY A AHU TO BY AHU-1 TO 8	) A SINGLE VALUE 0°F). A SEPARATE

TERMINAL AIR BOX REPORT GENERATION

				Drawing Title	Project Title	Project Number	
		CONSULTANTS:	ARCHITECT:	Drawing Title	Project Title RENOVATE AND EXPAND	549-130	
		LEALTUCADE DI ANNIEDS. VOA ADCUITECTS		CONTROL DIAGRAM - VENTILATION	AMBULATORY CARE AND LAB. SAM RAYBURN MEMORIAL	Building Number	Office of
		HEALTHCARE PLANNERS: VOA ARCHITECTS	MICHAEL ROTH & ASSOCIATES.		VETERANS CENTER	1	Facilities
		MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS		Approved: Project Director	Location	Drawing Number	Management
		CIVIL ENGINEER: JD ENGINEERING	ARCHITECTS & PLANNERS, INC.		BONHAM, TEXAS		
		COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date Checked Drawn	MH601	/_/_ Danartmant of
D	ate	INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.			APRIL 13, 2015 DAVING NATJAC	Dwg. 70 of <b>142</b>	Veterans Affairs



AHU REPORT GENERATION:
DDC FMCS SHALL MONITOR THE FOLLOWING POINTS ON 10 MINUTE (ADJ.) INTERVALS WITHIN A SINGLE TREND, THE TREND SHALL RUN FOR A 100-DAY (ADJ.) DURATION AT WHICH POINT THE NEWEST VALUES SHALL AUTOMATICALLY OVERWRITE THE OLDEST VALUES: GLOBAL OUTSIDE AIR TEMP [°F] GLOBAL OUTSIDE AIR DEWPOINT [°F] GLOBAL OUTSIDE AIR HUMIDITY [%RH] SUPPLY AIRFLOW [CFM] SUPPLY AIR TEMP (SAT) [°F] SUPPLY AIR TEMP SETPOINT [°F] SUPPLY AIR RELATIVE HUMIDITY [%] SUPPLY AIR DEWPOINT [°F] SUPPLY AIR DEWPOINT SETPOINT [°F] RETURN AIRFLOW [CFM] RETURN AIR TEMP (RAT) [°F] RETURN AIR RELATIVE HUMIDITY [%] OUTSIDE AIRFLOW [CFM] MIXED AIR TEMP [°F] PREHEAT COIL DISCHARGE AIR TEMP [°F] PRE-FILTER LOADING (MERV-8) [INCHES W.G.] PRE-FILTER LOADING (MERV-11) [INCHES W.G.] FINAL FILTER LOADING [INCHES W.G.] HEATING WATER VALVE POSITION [% OPEN] HEATING PUMP [ON/OFF] CHILLED WATER VALVE POSITION [% OPEN] HUMIDIFIER VALVE POSITION [% OPEN] HUMIDIFIER ISOLATION VALVE [OPEN/CLOSED] SUPPLY DUCT STATIC PRESSURE SETPOINT [INCHES W.G.] SUPPLY DUCT STATIC PRESSURE [INCHES W.G.] SUPPLY FAN VFD OUTPUT [% FULL SPEED] RETURN FAN VFD OUTPUT [% FULL SPEED] OUTSIDE AIR DAMPER POSITION [% OPEN] RETURN AIR DAMPER POSITION [% OPEN] RELIEF AIR DAMPER POSITION [% OPEN] THIS INFORMATION SHALL BE ACCESSIBLE TO VIEW IN GRAPHICAL FORM ON THE FMCS OPERATOR WORKSTATION. ONCE PER MONTH, THE DDC FMCS SHALL RECORD THE LARGEST AHU AIRFLOW WHICH OCCURED DURING THAT MONTH. THE DATE, TIME, OUTSIDE AIR TEMP (AND ALL OTHER VALUES LISTED ABOVE) THAT COINCIDED WITH THAT EVENT SHALL ALSO BE RECORDED. THIS INFORMATION SHALL BE STORED TO A MEMORY LOCATION ON THE FMCS OPERATOR WORKSTATION THAT IS MAINTAINED (NOT AUTOMATICALLY OVERWRITTEN).

AIR HANDLER REPORT GENERATION
TYPICAL FOR AHU-1 AND AHU-2

VA FORM 08-6231, OCT 1978

**SEQUENCE OF OPERATION:** WHEN AHU IS INDEXED TO RUN, THE FOLLOWING SHALL OCCUR SMOKE DAMPERS SHALL OPEN. AFTER A 30 SECOND DELAY (ADJ.) TO ALLOW FOR OPENING OF SMOKE DAMPERS. SUPPLY FAN SHALL BE ENABLED TO RUN. WHEN THE SUPPLY FAN HAS STARTED THE RETURN FAN AND INTERLOCKED EXHAUST FANS SHALL START AS SHOWN IN THE FAN SUPPLY FAN OPERATION:
FMCS SHALL MODULATE SIGNAL TO SUPPLY FAN VFD AS REQUIRED TO MAINTAIN DUCT STATIC PRESSURE AS MEASURED BY STATIC PRESSURE TRANSMITTER. FMCS SHALL RESET SUPPLY DUCT STATIC PRESSURE SETPOINT AS REQUIRED TO MAINTAIN AT LEAST ONE SUPPLY TAB DAMPER 95% (ADJ.) OPEN. FMCS SHALL UTILIZE COMMAND TO ALL SUPPLY TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE. RETURN FAN SHALL BE INDEXED TO RUN WHENEVER THE SUPPLY FAN IS INDEXED TO RUN. FMCS SHALL MODULATE SIGNAL TO RETURN FAN VFD AS REQUIRED TO MAINTAIN THE AIRFLOW OFFSET AS INDICATED IN THE RETURN FAN AIRFLOW SCHEDULE. DISCHARGE AIR TEMPERATURE SET POINT: DISCHARGE AIR SET POINT SHALL BE 55°F (ADJ.). <u>DISCHARGE AIR TEMPERATURE RESET:</u>
RESET DISCHARGE AIR TEMPERATURE BASED ON THE ZONE WITH THE GREATEST CALL FOR COOLING. RESET THE TEMPERATURE AS FOLLOWS: WHEN WORST CASE TAB IS OPEN ABOVE 90% (ADJ.) FOR TEN MINUTES (ADJ.) THEN THE DISCHARGE AIR TEMPERATURE SHALL DROP BY 1°F (ADJ.). THIS SHALL CONTINUE UNTIL AHU MINIMUM DISCHARGE AIR TEMPERATURE OF 55°F (ADJ.) IS ACHIEVED. WHEN WORST CASE TAB IS OPEN BELOW 80% (ADJ.) FOR TEN MINUTES (ADJ.) THEN THE DISCHARGE AIR TEMPERATURE SHALL RAISE BY 1°F (ADJ.). THIS SHALL CONTINUE UNTIL AHU MAXIMUM DISCHARGE AIR TEMPERATURE OF 60°F (ADJ.) IS ACHIEVED. THE MAXIMUM RETURN AIR HUMIDITY SETPOINT SHALL BE 60% (ADJ.) IF RETURN AIR HUMIDITY IS GREATER THAN SETPOINT, RESET DISCHARGE AIR TEMPERATURE TO 55°F UNTIL RETURN AIR HUMIDITY IS 5% LESS THAN MAXIMUM SETPOINT. PROVIDE USER WITH OPTION TO USE EITHER STATIC PRESSURE RESET OR DISCHARGE AIR TEMPERATURE RESET. ONLY ONE CONTROL OPTION SHALL BE USED AT A TIME. GRAPHIC ON AHU SCREEN SHALL ALLOW USER TO TOGGLE FROM EITHER TEMPERATURE OR STATIC PRESSURE RESET. VENTILATION AIR CONTROL:
WHENEVER THE AIR HANDLING UNIT IS IN OCCUPIED MODE, THE OUTSIDE AIR DAMPER SHALL BE FULLY OPEN. THE RETURN AIR AND RELIEF AIR DAMPER SHALL MODULATE IN OPPOSITION TO MAINTAIN THE MINIMUM OUTSIDE AIR FLOW RATE PER AHU SCHEDULE, OR TO SATISFY THE ECONOMIZER DISCHARGE AIR SEQUENCE. WHEN IN MINIMUM OUTSIDE AIR MODE, FMCS SHALL MODULATE CHILLED WATER CONTROL VALVE AS REQUIRED TO MAINTAIN WHEN IN ECONOMIZER MODE, FMCS SHALL NOT MODULATE COOLING CONTROL VALVE UNLESS RETURN AIR DAMPER IS 5% (ADJ.) OPEN AND RELIEF AIR DAMPER IS 95% (ADJ.) OPEN. PREHEAT COIL CONTROLS SHALL BE ENABLED WHEN OUTSIDE AIR TEMP DROPS BELOW 50°F (ADJ.). PREHEAT COIL CONTROLS SHALL BE DISABLED WHEN OUTSIDE AIR TEMP RISES ABOVE 54°F (ADJ.). WHEN OUTSIDE AIR TEMPERATURE RISES ABOVE 38°F (ADJ.) FOR 10 MINUTES (ADJ.) HEATING WATER COIL CIRCULATION PUMP SHALL OPERATE ONLY WHEN HEATING IS CALLED FOR (HEATING WATER VALVE IS COMMANDED TO OPEN). WHEN OUTSIDE AIR TEMP DROPS BELOW 38°F (ADJ.) HEATING WATER COIL CIRCULATION PUMP SHALL OPERATE CONTINUOUSLY. ONCE ENERGIZED, HEATING WATER COIL CIRCULATION PUMP SHALL REMAIN IN OPERATION FOR MINIMUM 5 MINUTES (ADJ.) TO PREVENT SHORT CYCLING. FMCS SHALL MODULATE HEATING WATER CONTROL VALVE AS REQUIRED TO MAINTAIN DISCHARGE AIR TEMPERATURE SET POINT. WHEN THE OUTSIDE AIR DRY BULB TEMPERATURE IS LESS THAN THE RETURN AIR DRY BULB TEMPERATURE THE FMCS SHALL ENABLE ECONOMIZER CONTROLS. WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS GREATER THAN THE RETURN AIR DRY BULB TEMPERATURE FOR 10 MINUTES THE FMCS SHALL DISABLE ECONOMIZER CONTROLS AND SHALL RETURN THE UNIT TO MINIMUM OUTSIDE AIR MODE. ONCE ECONOMIZER CONTROLS HAVE BEEN ENABLED OR DISABLED, THE UNIT SHALL CONTINUE TO OPERATE IN THAT MODE FOR A MINIMUM OF 10 MINUTES (ADJ.) BEFORE BEING ALLOWED TO SWITCH BACK (TO PREVENT SHORT CYCLING). IN ECONOMIZER MODE THE FMCS SHALL MODULATE THE RETURN AND RELIEF DAMPERS AS REQUIRED TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT. HUMIDIFIER CONTROLS:
HUMIDIFIER CONTROLS AND ALARMS SHALL BE ENABLED WHEN OUTSIDE AIR TEMPERATURE DROPS BELOW 48°F (ADJ.) AT WHICH POINT THE ISOLATION STEAM VALVE SHALL FULLY OPEN. HUMIDIFIER CONTROLS AND ALARMS SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURE RISES ABOVE 48°F (ADJ.) FOR 10 MINUTES (ADJ.) AT WHICH POINT THE ISOLATION STEAM VALVE SHALL FULLY WHEN HUMIDIFIER CONTROLS ARE ENABLED, FMCS CONTROLLER SHALL MODULATE STEAM VALVE AS REQUIRED TO MAINTAIN 43°F WB (ADJ.) IN THE SUPPLY AIR DUCT. DUCT MOUNTED HUMIDITY TRANSMITTER AT FAN DISCHARGE SHALL PREVENT SUPPLY AIR RELATIVE HUMIDITY FROM EXCEEDING 80% (ADJ.).

ALARMS, INTERLOCKS, AND SAFETIES: WHEN FIRE ALARM CONTROL PANEL INDICATES AN ALARM CONDITION, AHU SHALL BE SHUTDOWN. HE FOLLOWING CONDITIONS SHALL SHUTDOWN THE AHU AND SHALL INDICATE AN ALARM CONDITION AT THE FMCS WORKSTATION: LOW STATIC PRESSURE SWITCH INDICATES RETURN DUCT PRESSURE LESS THAN THE SPECIFIED DUCT PRESSURE CLASS. LOW STATIC PRESSURE SWITCH INDICATES MIXED AIR PRESSURE LESS THAN THE SPECIFIED DUCT PRESSURE CLASS OF THE OUTSIDE AIR DUCTWORK. HIGH STATIC PRESSURE SWITCH INDICATES SUPPLY DUCT STATIC PRESSURE GREATER THAN THE SPECIFIED DUCT PRESSURE SHOULD ANY ONE FOOT SECTION OF THE MANUAL RESET LOW LIMIT TEMPERATURE SWITCH #1 SENSE AIR TEMP <34°F (ADJ.). IF MULTIPLE FREEZE STATS ARE REQUIRED, WIRE ALL TO A COMMON RESET SWITCH. THE FOLLOWING CONDITIONS SHALL INDICATE AN ALARM AT THE FMCS, HOWEVER AHU SHALL CONTINUE TO OPERATE: HEATING COIL CIRCULATION PUMP IS COMMANDED TO RUN AND CURRENT RELAY INDICATES INSUFFICIENT CURRENT FLOW. AN ALARM IS INDICATED AT ANY SUPPLY FAN VFD OR RETURN FAN VFD. DIFFERENTIAL PRESSURE SWITCH ACROSS PRE-FILTER (MERV 8) BANK EXCEEDS 0.6 INCHES W.G. (ADJ.) DIFFERENTIAL PRESSURE SWITCH ACROSS PRE-FILTER (MERV 11) BANK EXCEEDS 0.8 INCHES W.G. (ADJ.) DIFFERENTIAL PRESSURE SWITCH ACROSS FINAL FILTER BANK EXCEEDS 1.0 INCHES W.G. (ADJ.) THE TOTAL DIFFERENTIAL PRESSURE ACROSS ALL FILTER BANKS EXCEEDS 2.0 INCHES W.G. (ADJ.) RELATIVE HUMIDITY OF SUPPLY AIR EXCEEDS 80% RH (ADJ.) AS MEASURED BY AUTOMATIC RESET HUMIDITY SWITCH. WHEN HUMIDITY SWITCH TRIPS, STEAM CONTROL VALVE SHALL FULLY CLOSE UNTIL ALARM IS MANUALLY RESET AT FMCS WORKSTATION. AN ALARM SHALL NOT INDICATE AT THE FMCS WORKSTATION UNLESS HUMIDIFIER CONTROLS ARE ENABLED. WHEN DUCTWORK SUPPLY AIR HUMIDITY EXCEEDS 90% RH A SEPARATE DUCT MOUNTED HUMIDITY SWITCH (MANUAL RESET) SHALL DISABLE HUMIDIFIER CONTROLS AND SHALL FULLY CLOSE STEAM ISOLATION VALVE. AN IDENTIFIABLE ALARM CONDITION SHALL BE DISPLAYED AT THE OPERATOR WORKSTATION. SHOULD ANY ONE FOOT SECTION OF THE AUTO RESET LOW LIMIT TEMPERATURE SWITCH #2 SENSE AIR TEMPERATURE <38°F (ADJ.) THE FOLLOWING SHALL OCCUR: THE RETURN AIR DAMPER SHALL FULLY OPEN. THE OUTSIDE AIR AND RELIEF DAMPERS SHALL FULLY CLOSE. THIS ACTION SHALL OCCUR INDEPENDENT OF THE FMCS AHU CONTROLLER. ONCE THE LOW LIMIT TEMPERATURE SWITCH #2 AIR TEMPERATURE RISES ABOVE SET POINT, OPERATION OF THE OUTSIDE AIR, RELIEF AIR, AND RETURN AIR DAMPERS SHALL BE RESTORED. HOWEVER, THE ALARM SHALL CONTINUE UNTIL ACKNOWLEDGED AND MANUALLY RESET BY THE FMCS OPERATOR. SEND AN ALARM TO THE FMCS OPERATOR INTERFACE IF THE DISCHARGE AIR TEMPERATURE IS MORE THAN 5°F (ADJ.) ABOVE IN THE EVENT SUPPLY FAN IS NOT RUNNING (AS INDICATED BY THE CURRENT SENSING RELAYS) RETURN AIR FAN SHALL BE DE-WHENEVER AHU/RTU IS SHUTDOWN THE FOLLOWING SHALL OCCUR:

• THE OUTSIDE AIR DAMPER AND RELIEF AIR DAMPER SHALL FULLY CLOSE. RETURN AIR DAMPER SHALL FULLY OPEN. PREHEAT COIL HEATING WATER CIRCULATION PUMP AND HEATING WATER CONTROL VALVE SHALL REMAIN UNDER CONTROL OF ITS INPUT SENSOR. ALL SMOKE DAMPERS SHALL FULLY CLOSE. CHILLED WATER CONTROL VALVE SHALL FULLY CLOSE. ISOLATION STEAM VALVE SHALL FULLY CLOSE. SUPPLY FAN AND RETURN FAN VFDS SHALL BE DE-ENERGIZED. INTERLOCKED EXHAUST FANS SHALL BE DE-ENERGIZED. PROVIDE TIME OF DAY SCHEDULE TO ALLOW AHU TO ENTER UNOCCUPIED MODE PER SCHEDULE. COORDINATE SCHEDULE WITH THE SUPPLY AND RETURN FANS SHALL CONTINUE RUNNING. WHEN USING CONSTANT VOLUME OFFSET FOR RETURN AIR FAN CONTROL, THE OFFSET SHALL GO TO ZERO AND THE SUPPLY FAN SHALL BE LIMITED TO THE MAXIMUM RETURN FAN AIRFLOW. THE OUTSIDE AIR AND RELIEF AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN. ECONOMIZER CYCLE SHALL TAKE PRECEDENCE OVER DAMPER POSITION. ALL SPACE TEMPERATURES SHALL BE ALLOWED TO VARY +/- 10°F (ADJ.) FROM OCCUPIED SETPOINT. HEATING OPTIMUM START-UP: THIS CYCLE SHALL OVERRIDE THE UNOCCUPIED CYCLE. IF THE SYSTEM WAS OPERATING AS A RESULT OF THE UNOCCUPIED CYCLE, THE SYSTEM SHALL CONTINUE TO OPERATE. THE DDC SYSTEM SHALL DETERMINE THE MINIMUM RUNTIME TO WARM THE SPACES TO THEIR SETPOINT WHEN THE COMPUTED START TIME IS REACHED. THE AIR HANDLING UNIT DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT A SETPOINT OF 85°F (ADJ.). THE SYSTEM SHALL CONTINUE TO OPERATE IN THIS MODE UNTIL ALL TEMPERATURES EXCEED A SETPOINT OF 68°F (ADJ.). AT THAT TIME, THE DDC SYSTEM SHALL SWITCH TO OCCUPIED CONTROL. THIS CYCLE SHALL OVERRIDE THE UNOCCUPIED CYCLE. IF THE SYSTEM WAS OPERATING AS A RESULT OF THE UNOCCUPIED CYCLE, THE SYSTEM SHALL CONTINUE TO OPERATE. THE DDC SYSTEM SHALL DETERMINE THE MINIMUM RUNTIME TO COOL THE SPACES TO THEIR SETPOINT WHEN THE COMPUTED START TIME IS REACHED. THE AIR HANDLING UNIT DISCHARGE AIR TEMPERATURE SHALL BE MAINTAINED AT A SETPOINT OF 55°F (ADJ.). THE SYSTEM SHALL CONTINUE TO OPERATE IN THIS MODE UNTIL ALL TEMPERATURES ARE LESS THAN A SETPOINT OF 75°F (ADJ.). AT THAT TIME, THE DDC SYSTEM SHALL SWITCH TO OCCUPIED CONTROL. <u>GRAPHICAL DISPLAY:</u> DISPLAY THE GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY ON AHU GRAPHIC PAGE.

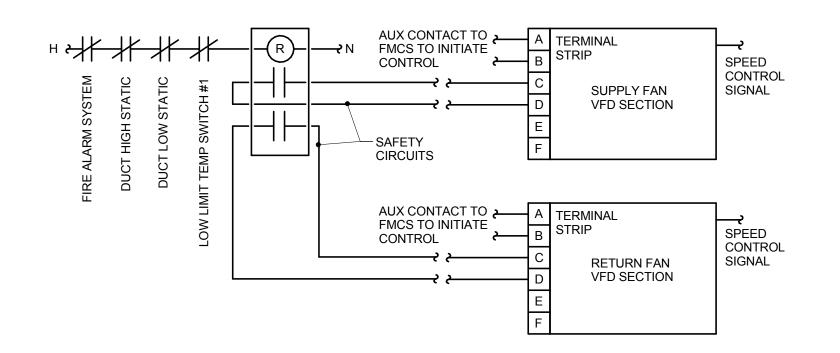
RETURN FAN AIRFLOW SCHEDULE						
SYSTEM	SUPPLY CFM (MAX)	EXHAUST FANS	PRESSURIZATION CFM	REMARKS		
AHU-1	13,000	EF-1, EF-3, EF-4	500	NOTES 1,2,3,4		
AHU-2	13,000	EF-2	500	NOTES 1,2,3,4		

- 1. RETURN FAN AIRFLOW SETPOINT SHALL BE THE SUPPLY FAN AIRFLOW (AS MEASURED BY THE AFMS) MINUS THE SUM OF THE EXHAUST FAN AIRFLOWS MINUS THE PRESSURIZATION CFM.
- 2. THE RETURN FAN VFD SHALL MODULATE THE RETURN AIRFLOW TO MAINTAIN THE 500 CFM PRESSURIZATION CFM AS THE SUPPLY FAN VFD MODULATES THE SUPPLY AIRFLOW.
- 3. FMCS SHALL DETERMINE THE OPERATIONAL STATUS OF EACH EXHAUST FAN VIA THE CURRENT SENSING RELAY TO DETERMINE WHETHER THE CFM ASSOCIATED WITH THAT FAN SHOULD BE
- 4. EXHAUST FAN AIRFLOWS SHALL NOT BE THE CFM INDICATED ON THE FAN SCHEDULE, BUT SHALL BE THE AIRFLOW INDICATED IN THE FINAL TAB REPORT.

INCLUDED IN THE RETURN FAN AIRFLOW CALCULATION.

FAN INTERLO	FAN INTERLOCK SCHEDULE				
SYSTEM	INTERLOCKED EXHAUST FANS	REMARKS			
AHU-1	EF-1, EF-3, EF-4	NOTE 1			
AHU-2	EF-2	NOTE 1			

1. INTERLOCK EXHAUST FAN OPERATION THROUGH THE FMCS WITH RESPECTIVE AHU IN ACCORDANCE WITH AHU SEQUENCE OF OPERATION.



SUPPLY & RETURN FAN VFD CONTROL

1	AIR HANDLING UNIT CONTROL - AHU-1 & AHU-2 NO SCALE
	NO SCALE

	CONSULTANTS:	ARCHITECT:	Drawing Title	Project Title RENOVATE AND EXPAND  AMBULATORY CARE AND LAB.	Project Number 549-130	Ottionot
	HEALTHCARE PLANNERS: VOA ARCHITECTS  MEPFP + TECH + STRUCT: KJWW CONSULTING ENGINEERS	MICHAEL ROTH & ASSOCIATES,	CONTROL DIAGRAM - VENTILATION	SAM RAYBURN MEMORIAL VETERANS CENTER		Office of Facilities
	CIVIL ENGINEER: JD ENGINEERING  COST ESTIMATING: MOSS CONSTRUCTION COST MANAGEMENT	ARCHITECTS & PLANNERS, INC.	Approved: Project Director	Location BONHAM, TEXAS	Drawing Number MH602	Management
Revisions:	INDUSTRIAL HYGIENE: JOHN A. JURGIEL & ASSOCIATES, INC.	200 SOUTH HANLEY ROAD, STE. 1105, CLAYTON, MISSOURI 63105, 314-862-2112		Date Checked Drawn APRIL 13, 2015 DAVING NATJAC	Dwg. 71 of 142	Department of Veterans Affairs